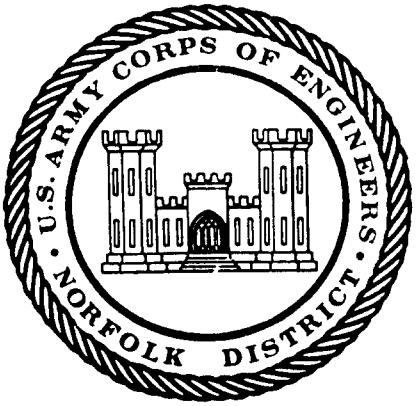
JAMES RIVER BASIN

Name Of Dam: PEDLAR RIVER
Location: AMHERST COUNTY
Inventory Number: VA 00905

LEVEL II

PHASE I INSPECTION REPORT
NATIONAL DAM SAFTY PROGRAM



PREPARED BY
NORFOLK DISTRICT CORPS OF ENGINEERS
803 FRONT STREET
NORFOLK, VIRGINIA 23510

JUNE 1980

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

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20. Abstract

Pursuant to Public Law 92-367, Phase I Inspection Reports are prepared under guidance contained in the recommended guidelines for safety inspection of dams, published by the Office of Chief of Engineers, Washington, D. C. 20314. The purpose of a Phase I investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general conditions of the dam is based upon available data and visual inspections. Detailed investigation and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify any need for such studies.

Based upon the field conditions at the time of the field inspection and all available engineering data, the Phase I report addresses the hydraulic, hydrologic, geologic, geotechnic, and structural aspects of the dam. The engineering techniques employed give a reasonably accurate assessment of the conditions of the dam. It should be realized that certain engineering aspects cannot be fully analyzed during a Phase I inspection. Assessment and remedial measures in the report include the requirements of additional indepth study when necessary.

Phase I reports include project information of the dam and appurtenances, all existing engineering data, operational procedures, hydraulic/hydrologic data of the watershed, dam stability, visual inspection report and an assessment including required remedial measures.

NAME OF DAM: PEDLAR RIVER DAM
LOCATION: AMHERST COUNTY, VIRGINIA
INVENTORY NUMBER: VA 00905

(6) PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM,

Pedlar River Dam
(Inventory Number VA 00905)
James River Basin,
Amherst County, Virginia.
Phase I Inspection Report.

PREPARED BY
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(9) Final rept., (11) Jun 84 (12) 59

(10) James A. Walsh

410030 LB

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PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of the Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation and analyses involving topographic mapping, subsurface investigations testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions be detected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established guidelines, the spillway design flood is based on the estimated "Probable Maximum Flood" for the region (flood discharges that may be expected from the most severe combination of critical meteorologic and hydrologic conditions that are reasonably possible), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the design flood should not be interpreted as necessarily posing a highly inadequate condition. The design flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

PHASE I REPORT
NATIONAL DAM SAFETY PROGRAM

BRIEF ASSESSMENT OF DAM

Name of Dam:	Pedlar River Dam
State:	Virginia
Location:	Amherst County
USGS Quad Sheet:	Buena Vista
Stream:	Pedlar River
Date of Inspection:	1 May 1980

Pedlar River Dam is a concrete gravity structure about 462.25 feet long and 80.5 feet high. The dam is owned and maintained by the City of Lynchburg, Virginia. The dam is classified as an intermediate size with a significant hazard classification. The spillway is a concrete opening in the center of the dam. The reservoir is used for water supply by the City of Lynchburg, Virginia and limited recreation controlled by the city representative at the dam site.

Based on criteria established by the Department of the Army, Office of the Chief of Engineers (OCE), the Spillway Design Flood (SDF) is the 1/2 PMF. The spillway will pass 23 percent of the PMF or 46 percent of the SDF without overtopping the dam. The SDF will overtop the dam by a maximum 3.92 feet, reach an average critical velocity of 9.3 feet per second and flow over the dam for 9.5 hours. The spillway is adjudged as inadequate but not seriously inadequate.

The visual inspection revealed no apparent problems and there are no immediate needs for remedial measures. There is a regular maintenance operation program, but no emergency warning system. It is recommended that a warning system be established and the maintenance items listed in Section 7.2 be accomplished as part of the regular maintenance program within the next 12 months.

Submitted By:
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District Engineer
Date: AUG 2 1980

Recommended By
Original Signed by
JACK G. STARR
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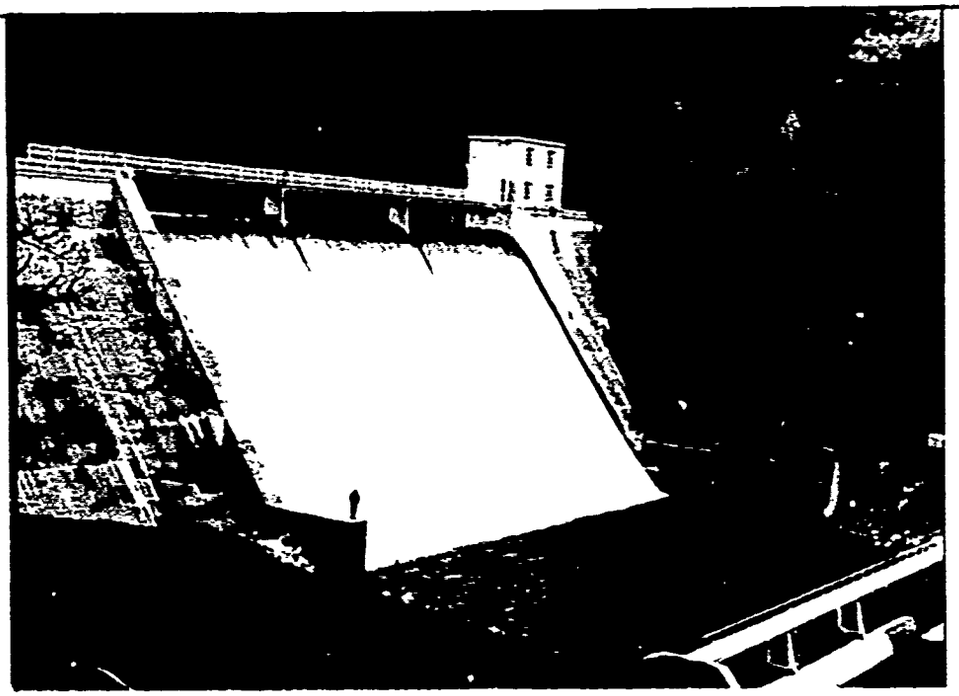
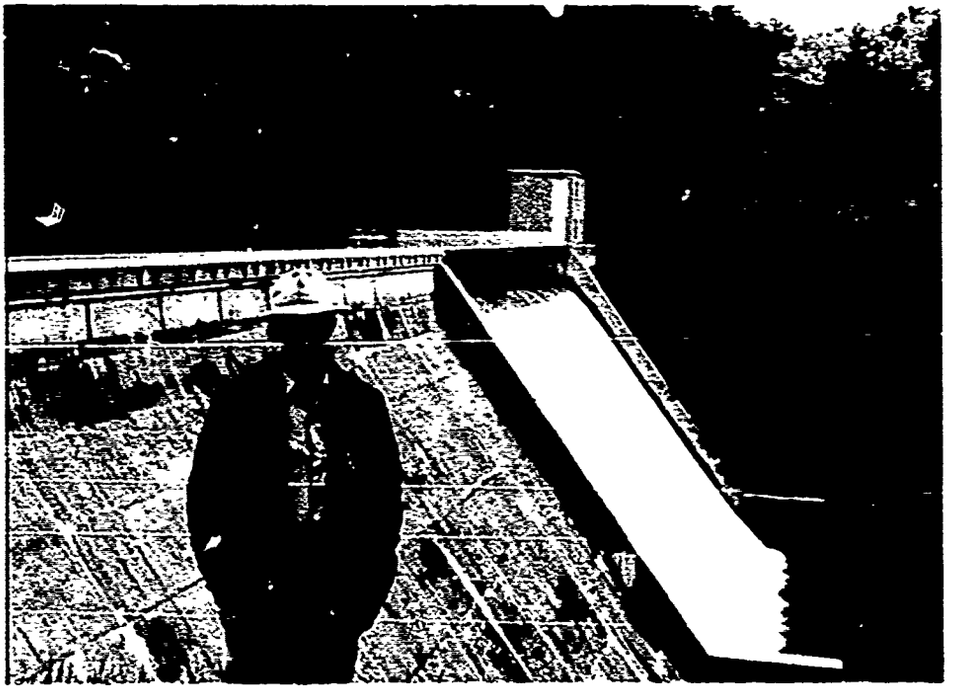
Chief, Engineering Division





OVERALL VIEWS OF PEDLAR RIVER DAM

1 MAY 1980

SECTION 1

PROJECT INFORMATION

1.1 GENERAL:

1.1.1 Authority: Public Law 92-367, 8 August 1972, authorized the Secretary of the Army, through the Corps of Engineers to initiate a national program of safety inspections of dams throughout the United States. The Norfolk District has been assigned the responsibility of supervising the inspection of dams in the Commonwealth of Virginia.

1.1.2 Purpose of Inspection: The purpose is to conduct a Phase I inspection according to the Recommended Guidelines for Safety Inspection of Dams (Reference 1, Appendix VI). The main responsibility is to expeditiously identify those dams which may be a potential hazard to human life or property.

1.2 Project Description:

1.2.1 Dam and Appurtenances: Pedlar River Dam is a concrete gravity dam 462.25 feet long at the crest of the dam and 80.5 feet high. The top of the dam consists of a walkway at elevation 1035.5 feet MSL with 2.5 feet parapet walls which extend to the top of dam at elevation 1038.0. The walkway passes over an ungated spillway 150 feet wide with a crest of 1029.5, located in the left center of the dam. Flow over the spillway washes into a stilling basin which is concrete lined. A concrete bridge crosses the end of the stilling basin where a small weir allows flow to discharge into the downstream channel.

According to available information, the base of the dam is embedded in rock. A system of underdrains was installed when the original dam was raised in 1934. These drains were connected to a new set of drains when the dam was again raised in 1964.

A 30-inch water supply pipe discharging through the dam at elevation 975.0 is fed by three intake gates. 24-inch sluice gates at elevation 995.0 and 978.0 are operated during dry conditions. A 30-inch by 24-inch gate at elevation 1022.75 is normally open to allow water to flow to Lynchburg, Virginia.

A 48-inch blow off valve at elevation 961.0 can be used to flush or drain the reservoir.

1.2.2 Location: Pedlar River Dam is located on Pedlar River about 5 miles southeast of Buena Vista, Virginia.

1.2.3 Size Classification: The dam is classified as an intermediate size structure by either height or maximum storage.

1.2.4 Hazard Classification: The dam is located upstream of a small community, which is about 4 miles from the dam. The valley below the dam forms a narrow gorge which in case of a dam failure, would carry a large volume of water through the community. Therefore, a significant hazard classification is given for this structure according to guidelines contained in Section 2.1.2 of Reference 1, Appendix VI. The hazard classification used to categorize dams is a function of location only and has nothing to do with their stability or probability of failure.

1.2.5 Ownership: City of Lynchburg, Virginia

1.2.6 Purpose: Water supply and limited recreation.

1.2.7 Design and Construction History: The original designer of the dam is unknown. Initially constructed in 1904, the spillway was raised in 1926 and the entire dam was raised in 1931 and again in 1964. The 1964 addition was designed by Wiley and Wilson and was constructed by English Construction Company.

1.2.8 Normal Operational Procedures: Water passes automatically over the spillway as the reservoir rises above the spillway crest. Water is withdrawn as needed through the 30-inch pipe running at low level through the dam.

1.3 Pertinent Data:

1.3.1 Drainage Area: The dam controls a drainage area of about 33 square miles.

1.3.2 Discharge at Dam Site: Maximum flood - approximately 6373 cfs during the remnants of Tropical Storm Camille when flow reached 60 inches deep in the spillway.

Pool level at top of dam

Spillway. . . . . 14125 cfs

1.3.3 Dam and Reservoir Data: Pertinent data on the dam and reservoir are shown in the following table:

TABLE 1.1 DAM AND RESERVOIR DATA

Item	Elevation feet msl	Reservoir			
		Area, acres	Capacity		Length miles
			Acre, feet	Watershed, inches	
Top of Parapet Wall (Crest of Dam)	1038.0	160	4600	2.61	1.61
Top of Walkway	1035.5	151	4250	2.41	1.59
Crest of Spillway	1029.5	137.7	3376	1.92	1.55
Streambed at Downsteam Toe of Dam	957.5±	—	—	—	—

SECTION 2

ENGINEERING DATA

2.1 Design: The engineering design information available from the City of Lynchburg consisted of design calculations, specifications, and contract drawings for an addition to the dam started in 1964. This addition was designed by Wiley and Wilson, Consulting Engineers of Lynchburg, Virginia.

2.2 Construction: The dam was originally constructed in 1904 and was raised in 1926, 1931, and 1964. The 1964 addition was constructed by the English Construction Company, Inc., of Altavista, Virginia. Concrete test reports made by Froehling and Robertson, Inc., indicate that construction took place during 1964 and 1965.

2.3 Evaluation: Information concerning the original design and foundation study was not available. More information concerning the foundation and the construction operations of the original section and each addition should be obtained if possible.

SECTION 3

VISUAL INSPECTION

3.1 General: An inspection of the Pedlar River Dam was made 1 May 1980. The weather was cloudy and the temperature was 55°F. The pool was at elevation 1029.7 MSL.

3.2 Dam and Appurtenances:

3.2.1 Findings: Field observations are recorded in the Visual Inspection Checklist, Appendix III. The concrete surfaces were in good condition. Edges of most of the joints were slightly weathered. All joints were in good alignment. No leaks were observed in the joints although there were calcium deposits along most of the joints. The only cracks in the dam observed appeared in the parapet along the top of the dam. Contraction cracks between control joints occurred in three sections along the papapet. A crack was also observed between the upstream parapet and the top of the dam at the north end of the spillway.

Of the six drains located on the face of the dam, four were discharging a small amount of water, less than 1 gpm. There was vegetation growing on the dam face below the one drain to the south of the spillway.

The surface of the spillway was slightly worn, concrete aggregate was exposed. The left wingwall was in good condition with only a slight amount of sloughing of soil at the end of the wall.

The gate house, a two story CMU-brick building, had a number of cracks in the CMU walls. The cracks were only visible on the interior. The exterior brick showed no cracking.

3.2.2 Reservoir: The reservoir was clear of debris except for one log caught at the top of the spillway.

3.2.3 Downstream Area: The downstream channel appeared stable. No signs of erosion were evident.

3.3 Evaluation: The dam appeared to be in good condition although only the 1964 addition to the dam was visible for inspection.

The drain discharges should be monitored periodically to note any change in flow or quality of discharge.

The cracks that have occurred in the parapet should be filled to try to eliminate any further deterioration.

The cracking of the walls in the gate house is a problem that should be investigated. The gate house design should be reviewed to determine if the material stored on the second floor is overloading the walls or if environmental factors are causing the cracks.

SECTION 4

OPERATIONAL PROCEDURES

4.1 Procedures: The normal storage pool is elevation 1029.5 feet msl, which is the crest of the spillway. The reservoir provides water for the City of Lynchburg, Virginia. Water passes automatically over the spillway as the reservoir rises above the spillway crest. A 30-inch water supply pipe located near the downstream left toe of the dam is operated by city personnel as needed. Appendix IV explains the operating plan for Pedlar River.

4.2 Maintenance: A regular maintenance program, as given in Appendix V, includes daily as well as annual maintenance items.

4.3 Warning System: At present time there is no warning system or evacuation plan for Pedlar River Dam.

4.4 Evaluation: The dam does not require an elaborate operational and maintenance procedure. The regular maintenance and operation program should be documented for future reference. An emergency operation and warning plan should be developed. It is recommended that a formal emergency procedure be prepared and furnished to all operating personnel. This should include:

a. How to operate the dam during an emergency.

b. Who to notify, including public officials, in case evacuation from the downstream area is necessary.

SECTION 5

HYDRAULIC/HYDROLOGIC DATA

5.1 Design: None were available.

5.2 Hydrologic Records: Daily rainfall and pool elevations are reported at the dam and were available during the inspection.

5.3 Flood Experience: The maximum flow observed was approximately 6373 cfs during the remnants of Tropical Storm Camille in which 5 feet of flow was noted in the spillway.

5.4 Flood Potential: The 1/2 PMF and PMF were developed and routed through the reservoir by use of the HEC-IDB computer program (Reference 2, Appendix VI) and appropriate unit hydrograph, precipitation and storage-outflow data. Clark's Tc and R coefficients for the local drainage area were estimated from basin characteristics. The rainfall applied to the developed unit hydrograph was obtained from a U. S. Weather Bureau Publication (Reference 3, Appendix VI).

5.5 Reservoir Regulation: Pertinent dam and reservoir data are shown in Table 1.1.

Water passes automatically through the spillway as the reservoir rises above the spillway crest. The 30-inch water supply pipe passes water through the dam, as regulated by the City of Lynchburg, Virginia. A 48-inch blow off valve is available to flush the reservoir or dewater it.

The storage curve was developed based on areas obtained from a U. S. Geological Survey Quadrangle Map. Rating curves were developed for the non-overflow section of the dam, spillway, and blow off valve. In routing hydrographs through the reservoir, it was assumed that the initial pool level was at elevation 1029.5.

5.6 Overtopping Potential: The probable rise in the reservoir and other pertinent information on reservoir performance is shown in the following table:

Table 5.1 RESERVOIR PERFORMANCE

Item	Normal Flow	1/2 PMF	PMF 1/
Peak flow, c.f.s.			
Inflow	33	32833	65667
Outflow	33	32758	65514
Maximum elevation ft, msl	1029.5	1041.9	1046.6
Non-overflow section (el. 1038.0)			
Depth of flow, ft.	-	3.9	8.6
Duration, hrs	-	9.5	14.5
Velocity, fps 2/	-	9.3	13.7
Tailwater elevation ft., msl 3/	963.3±	974.9	982.8

1/ The PMF is an estimate of flood discharges that may be expected from the most severe combination of critical meteorologic and hydrologic conditions that are reasonably possible in the region.

2/ Critical velocity.

5.7 Reservoir Emptying Potential: A 48-inch blow off valve located at elevation 961 feet MSL is available for flushing or dewatering the reservoir. The low level opening will permit withdrawal of about 468 cfs with the reservoir at normal pool and essentially dewater the reservoir in about 6 days. This is equivalent to an approximate drawdown rate of about 11 feet per day based on the hydraulic height measured from normal pool divided by the time to dewater the reservoir.

5.8 Evaluation: Based on the size (intermediate) and hazard classification (significant) the recommended Spillway Design Flood (SDF) is the 1/2 PMF to the PMF. Because of the risk involved the 1/2 PMF has been selected as the SDF. The spillway will pass 23 percent of the PMF or 46 percent of the SDF without overtopping the dam. The SDF will overtop the dam by a maximum of 3.92 feet with a critical velocity of 9.3 feet per second and remain above the top of the dam about 9.5 hours.

Conclusions pertain to present day conditions. The effect of future development on the hydrology has not been considered.

SECTION 6

DAM STABILITY

6.1 Geologic Setting: The Pedlar River Dam is located near the western limit of the Piedmont physiographic province on the northwest flank of the Catocin-Blue Ridge anticlinorium. The bedrock at the site is part of the Virginia Blue Ridge complex of precambrian igneous and metamorphic rocks. Locally, the bedrock is a fine to medium grained micaceous schist. Alluvial cobbles and gravels are present in the river channel. The slopes of the river valley are moderately steep with shallow residual soils and rock outcrops.

6.2 Evaluation:

6.2.1 Foundation and Abutments: There were no previous reports found detailing the geology of the area. Locally, the bedrock consists of a micaceous schist. It is fine to medium, grained, light grey-green when fresh and weathers to a yellowish brown. Outcrops were found on both abutments and in the river channel.

Observed joints on the right abutment had a strike of N36°W with an upstream dip of 80-85°. Joints on the left abutment dipped 75-80° downstream and has a strike of N82°E. Most joints were closed and only slightly weathered.

Secondary quartz was found in some left abutment joints. Spacings ranged from one to two feet.

Foliation planes were undulating and non-weathered with an east to west trend on both abutments.

No seepage was noted along the abutments during the visual inspection. The foliation planes and the primary joint system in the abutments are not adversely oriented. Condition of the foundation rock in the river is unknown due to lack of original construction reports. According to the specifications, some foundation grouting was to have been performed during the 1964 addition, but reports of the results were not available.

6.2.2 Stability Analysis: A stability check was made on a section of the spillway. The height of water behind the dam was assumed to be at the spillway crest, normal pool, and at 12.92 feet above the spillway crest, 1/2 PMF. For the normal pool condition, the vertical resultant of all forces fall within the middle third of the base. However, the overturning safety factor is only 1.54. For the 1/2 PMF condition the vertical resultant of all forces falls 7.75 feet outside of the middle third of the base and the overturning safety factor is 1.19. Under this condition the dam does not meet the stability criteria established in Reference 1, Appendix VI. Contract drawings show the dam base embedded in rock to such a degree that sliding is not a problem.

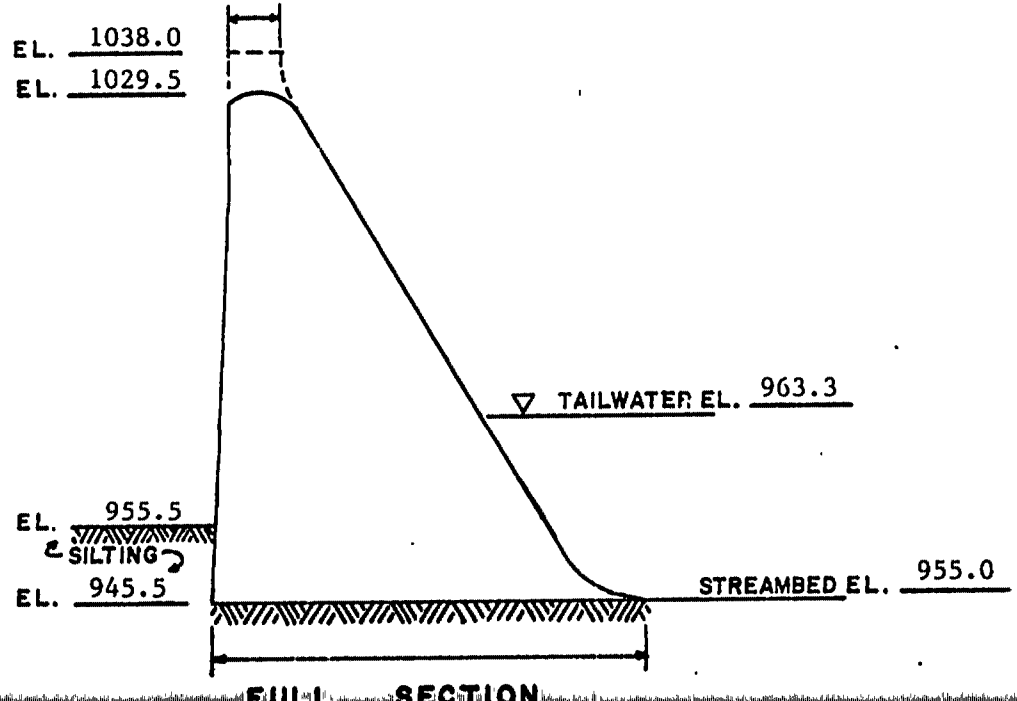
Since the stability check was made at the most critical station, the actual stability of the dam is not as marginal as indicated. The ground in front of the dam, sloping steeply from the spillway, adds to the dam's stability.

The construction of the dam is a subject that warrants further study. The additions made to the dam constitute potential weaknesses. Available drawings indicate the presence of dowels linking the additions together. The adequacy of the dowels to hold the dam together in the event of a flood of the magnitude of the 1/2 PMF should be investigated.

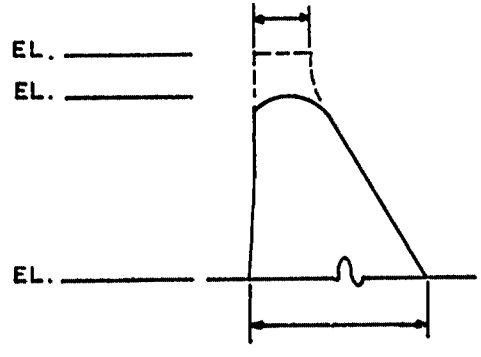
GRAVITY DAM DESIGN
STABILITY ANALYSIS

ANALYSIS DONE ON X FULL SECTION ___ PARTIAL SECTION
LOCATION OF SECTION Typical Section through Spillway
ANALYSIS PREPARED BY _____

LOADING CASE	ELEV. HEAD WATER	ELEV. TAIL WATER	ΣV	ΣH	ΣH/ΣV	LOCATION RESULTANT FROM TOE	% BASE IN COMPRESSION	FACTOR SAFETY SLIDING	FOUNDATION PRESSURE	
									TOE	HEEL
Normal Pool	1029.5	963.3	284.6K	212.0K	.74	35.2'	100%		4.95 ksf	2.00 ksf
½ PMF	1041.94	974.9	239.5K	264.9K	1.11	19.6'	71.6%		8.15 ksf	0 ksf



FULL SECTION



PARTIAL SECTION

SECTION 7

ASSESSMENT/REMEDIAL MEASURES

7.1 Dam Assessment: The available engineering data is inadequate for a full evaluation of the entire structure. The visual inspection revealed no findings that proved the dam to be unsound. There is a regular maintenance operations program. However, there is no emergency operation and warning plan. Overall, the dam is in good condition and there is no immediate need for remedial measures. Corps guidelines indicate the appropriate Spillway Design Flood (SDF) for an intermediate size and significant hazard dam, in this case. is the 1/2 PMF. The spillway will pass 23 percent of the PMF without overtopping the dam. The SDF will overtop the dam by a maximum of 3.92 feet with a critical velocity of 9.3 feet per second and remain above the top of the dam about 9.5 hours. Pedlar River Dam should not fail under these conditions. The spillway is adjudged inadequate, but not seriously inadequate.

7.2 Recommended Remedial Measures: It is recommended that the regular maintenance operation program be documented for future reference. A formal emergency procedure should be prepared and furnished to all operating personnel. This should include how to operate the dam during an emergency and who to notify including public officials, in case evacuation from the downstream area is necessary. Also, the inspection revealed the following maintenance items that should be scheduled by the owner during a regular maintenance period within the next 12 months:

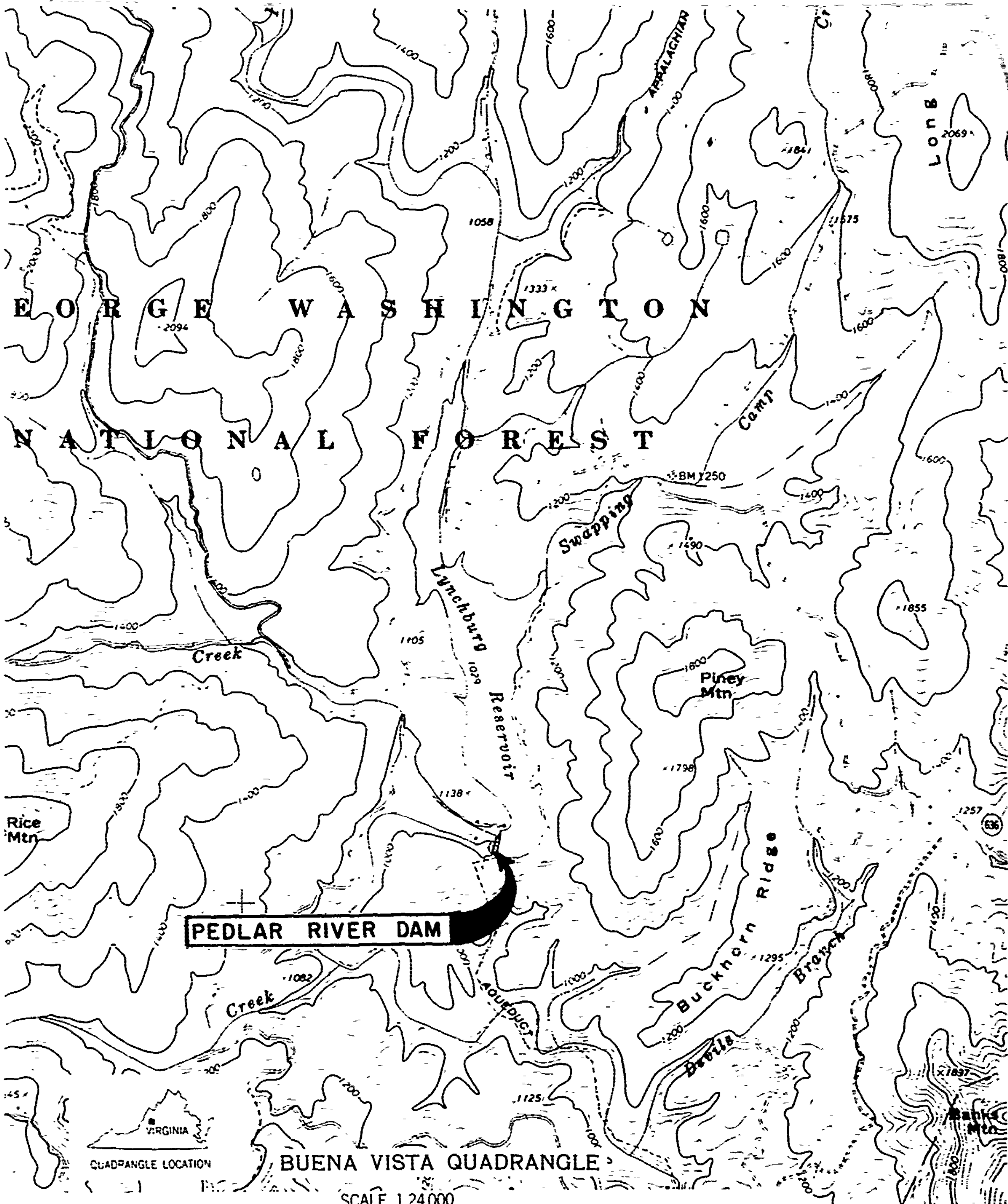
a. The drain discharges should be monitored to note any change in flow or quality of discharge.

b. The cracks in the parapet should be filled to eliminate any further deterioration.

c. The cracked walls in the gate house should be investigated to determine the cause.

APPENDIX I

MAPS AND DRAWINGS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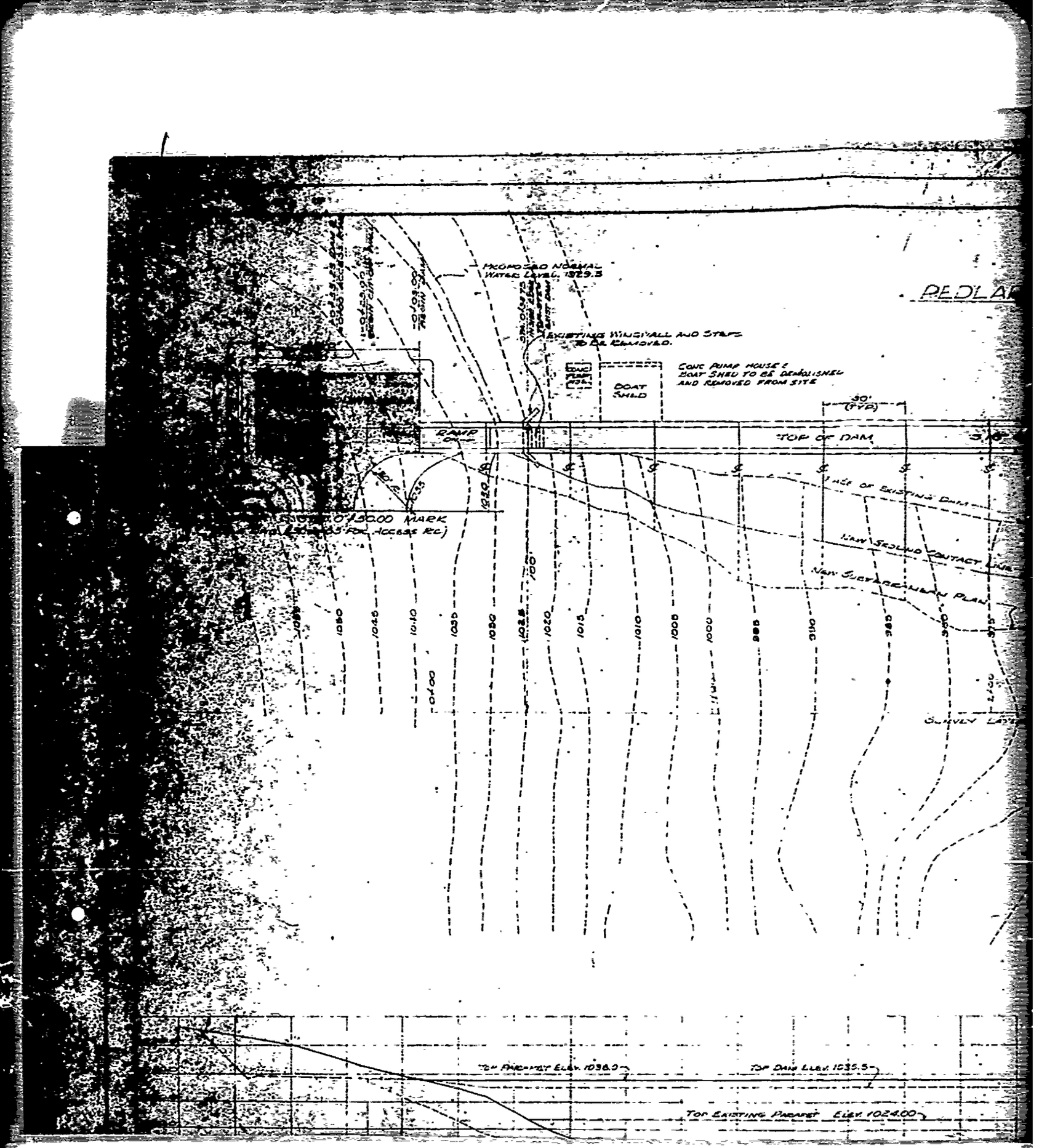
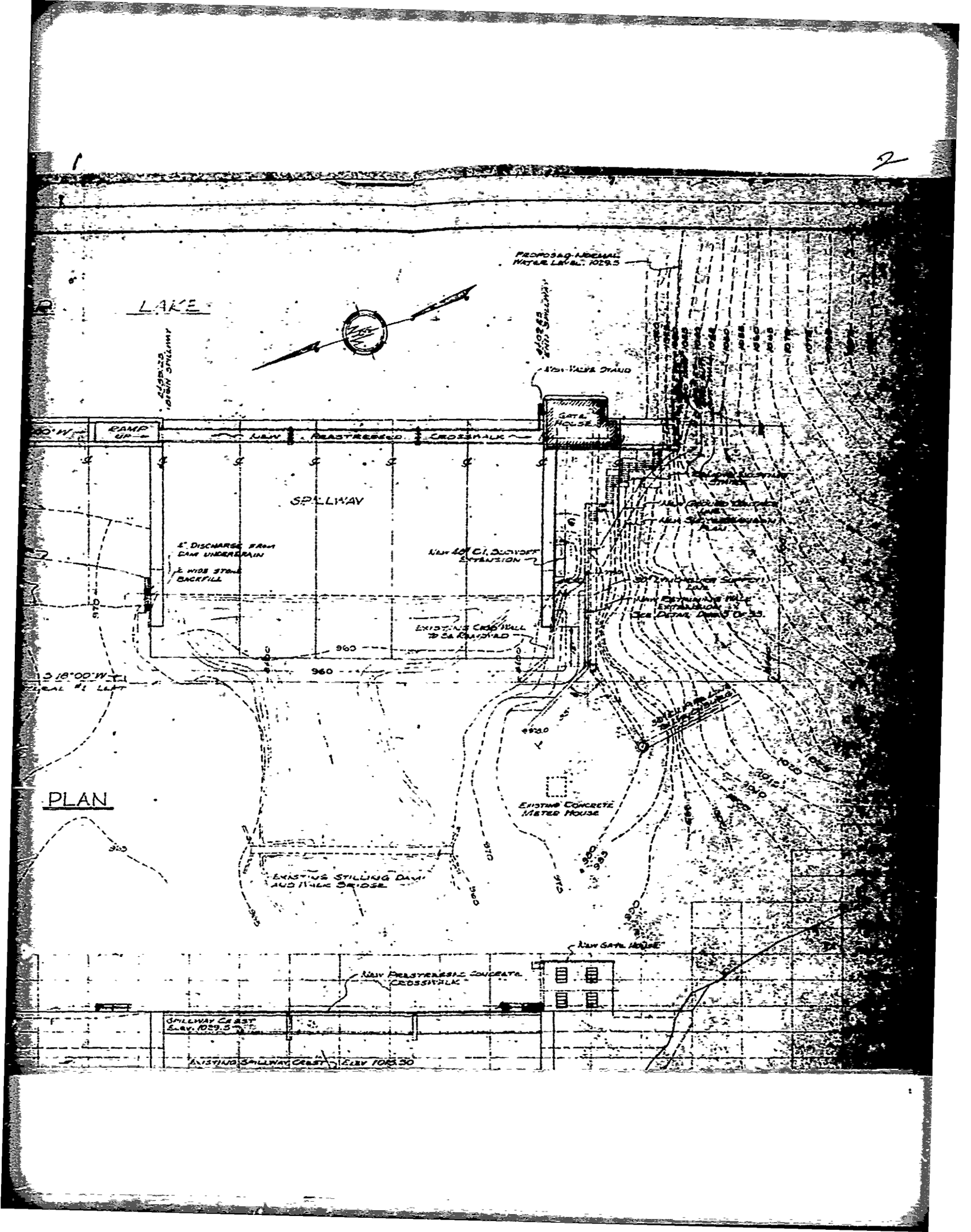
NATIONAL FOREST
APPALACHIAN
Long
Camp
Swapping
Lynchburg
Reservoir
Creek
Piney Mtn
Rice Mtn
PEDLAR RIVER DAM
AQUEDUCT
Creek
Buckhorn Ridge
Branch
Devils
Banks Mtn
BM 1250
VIRGINIA
QUADRANGLE LOCATION
BUENA VISTA QUADRANGLE
SCALE 1:24 000
1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 KILOMETER
CONTOUR INTERVAL 40 FEET


PROPOSED NORMAL WATER LEVEL 1029.5
EXISTING WINGWALL AND STEPS TO BE REMOVED.
CONC PUMP HOUSE & BOAT SHED TO BE DEMOLISHED AND REMOVED FROM SITE
BOAT SHED
30' (TYP)
TOP OF DAM
RAMP
1 ACE OF EXISTING DAM
NEW SEDIMENT CONTACT LINE
NEW SEDIMENT PLAN
SURVEY LINE
TOP PARAPET ELEV. 1038.0
TOP DAM ELEV. 1035.5
TOP EXISTING PARAPET ELEV. 1024.00


LAKE
SPILLWAY
RAMP UP
MAIN PRESTRESSED CROSSWALK
GATE HOUSE
PROPOSED NORMAL WATER LEVEL EL. 1029.5
EXISTING CROSS WALL
EXISTING CONCRETE METER HOUSE
EXISTING STILLING DAM AND FOOT BRIDGE
NEW GATE HOUSE
NEW PRESTRESSED CONCRETE CROSSWALK
SPILLWAY CREST ELEV. 1029.5
EXISTING SPILLWAY CREST ELEV. 1028.30
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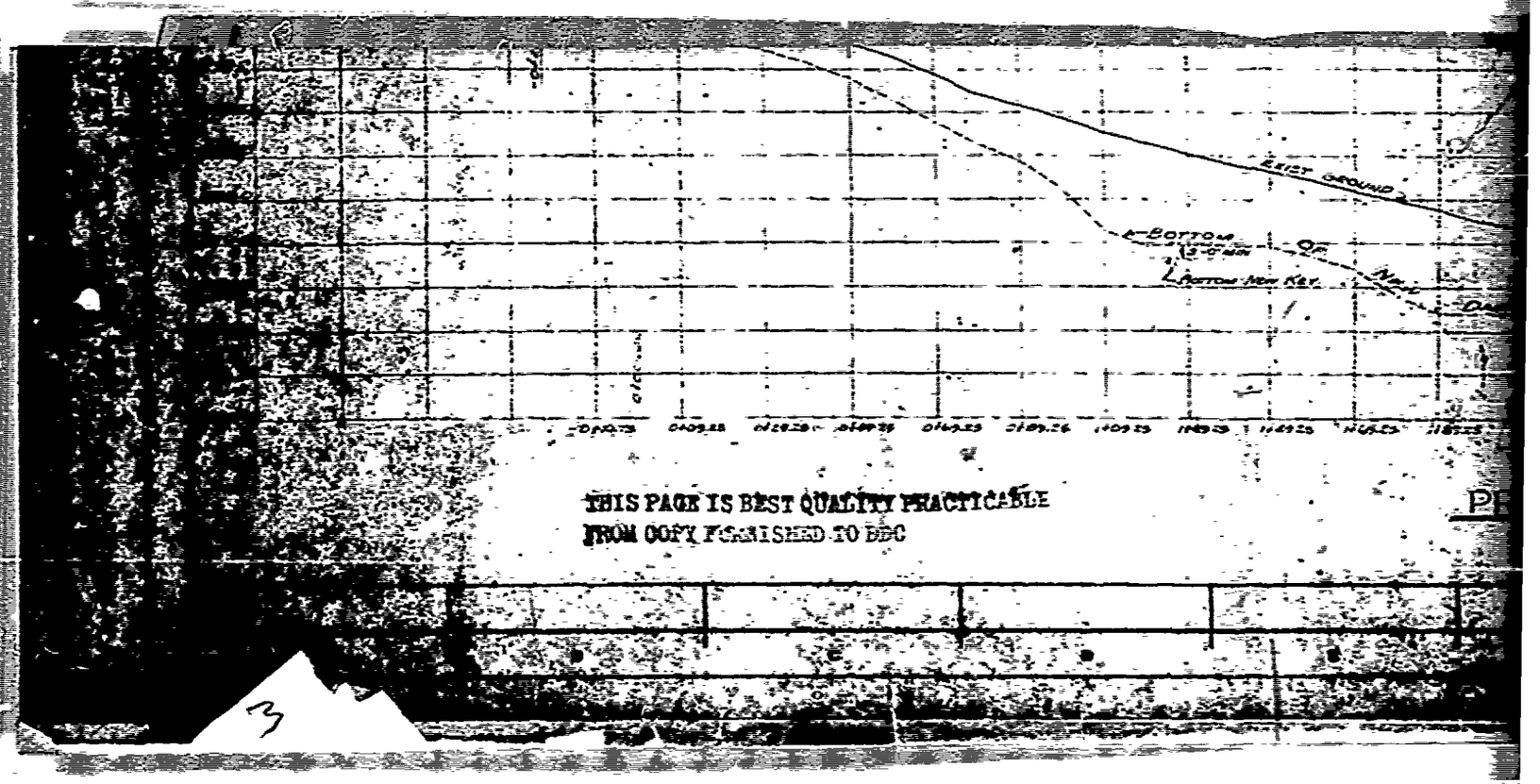
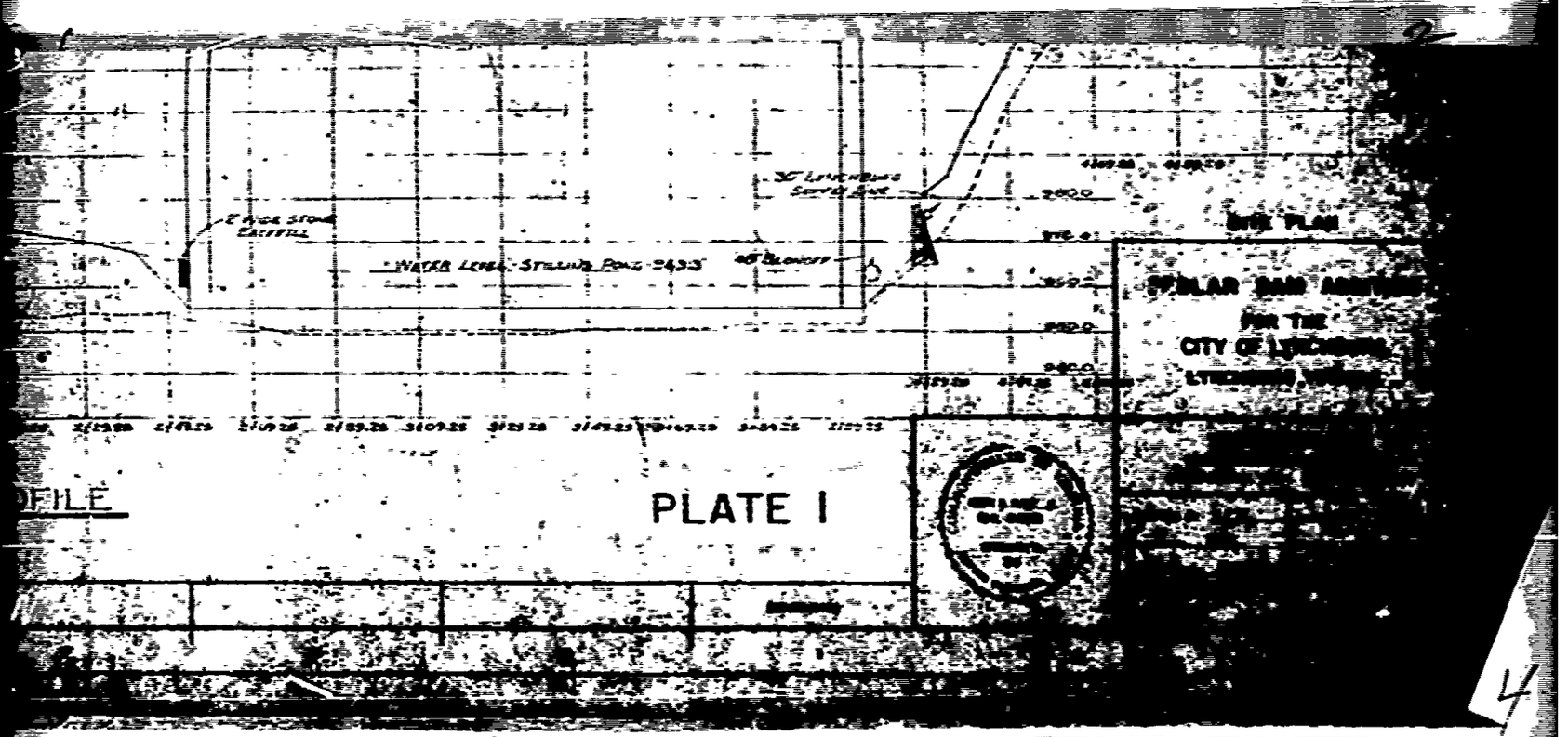
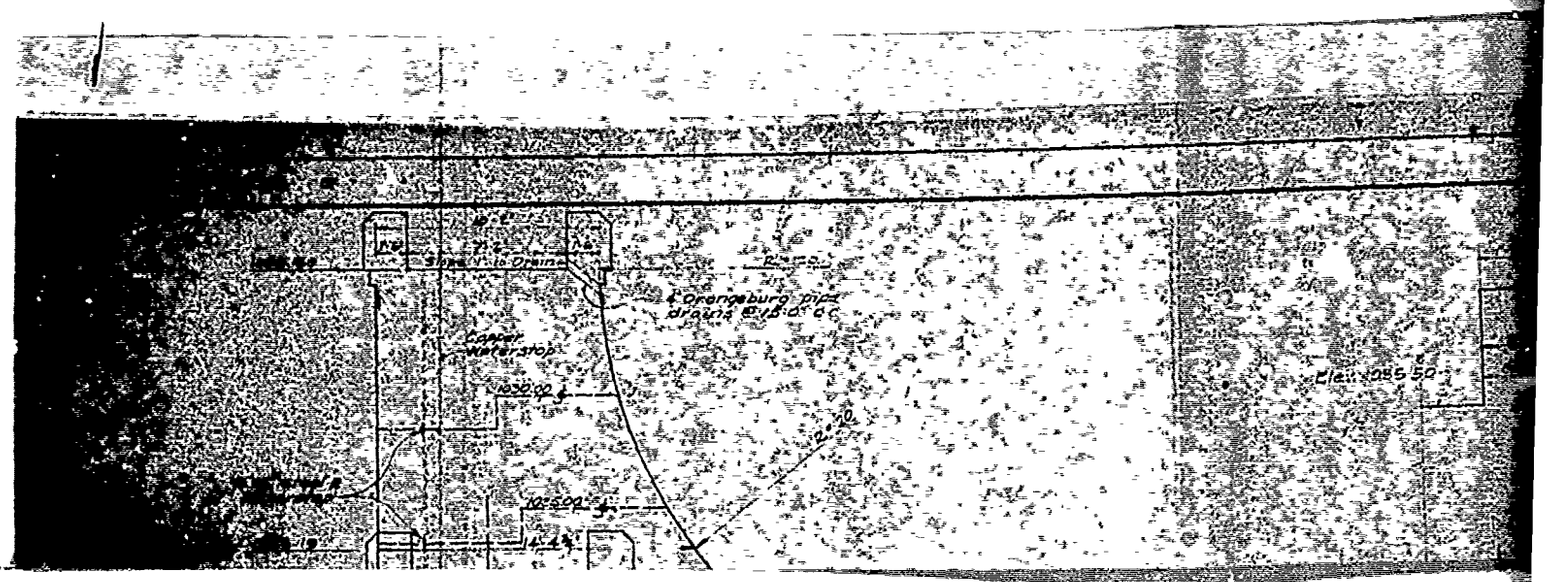
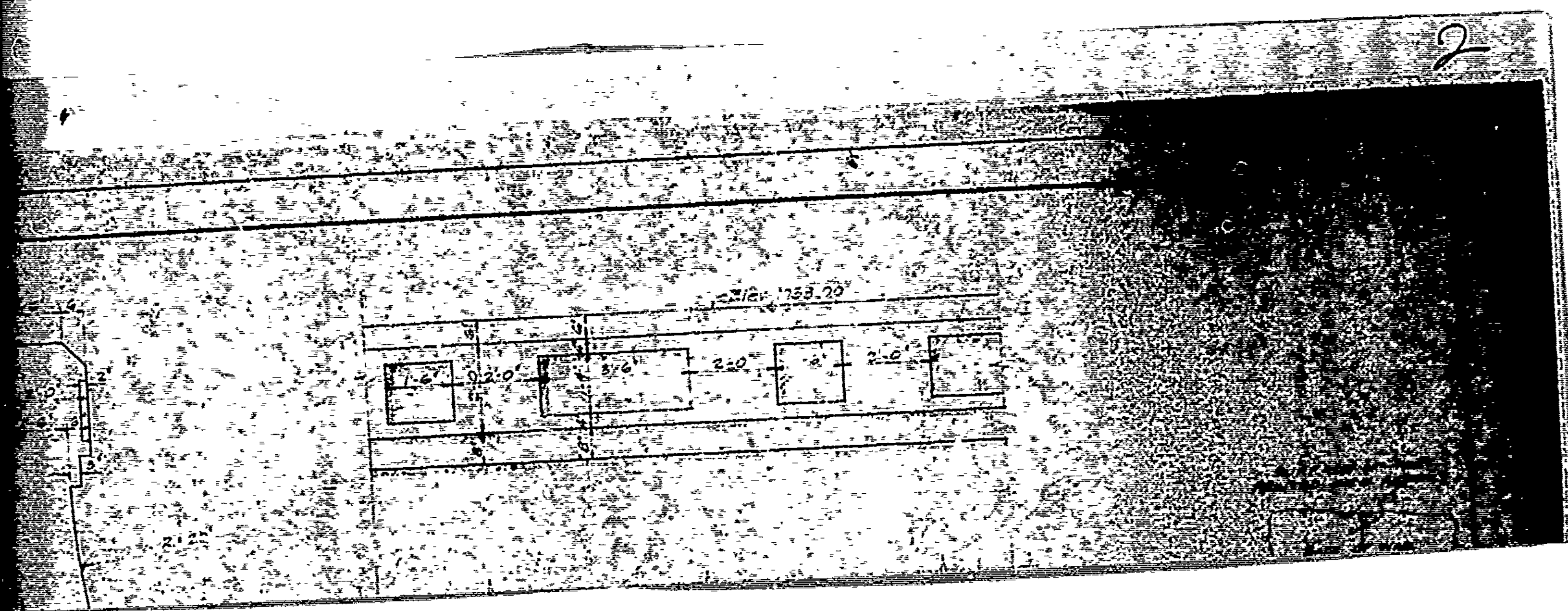
PLAN

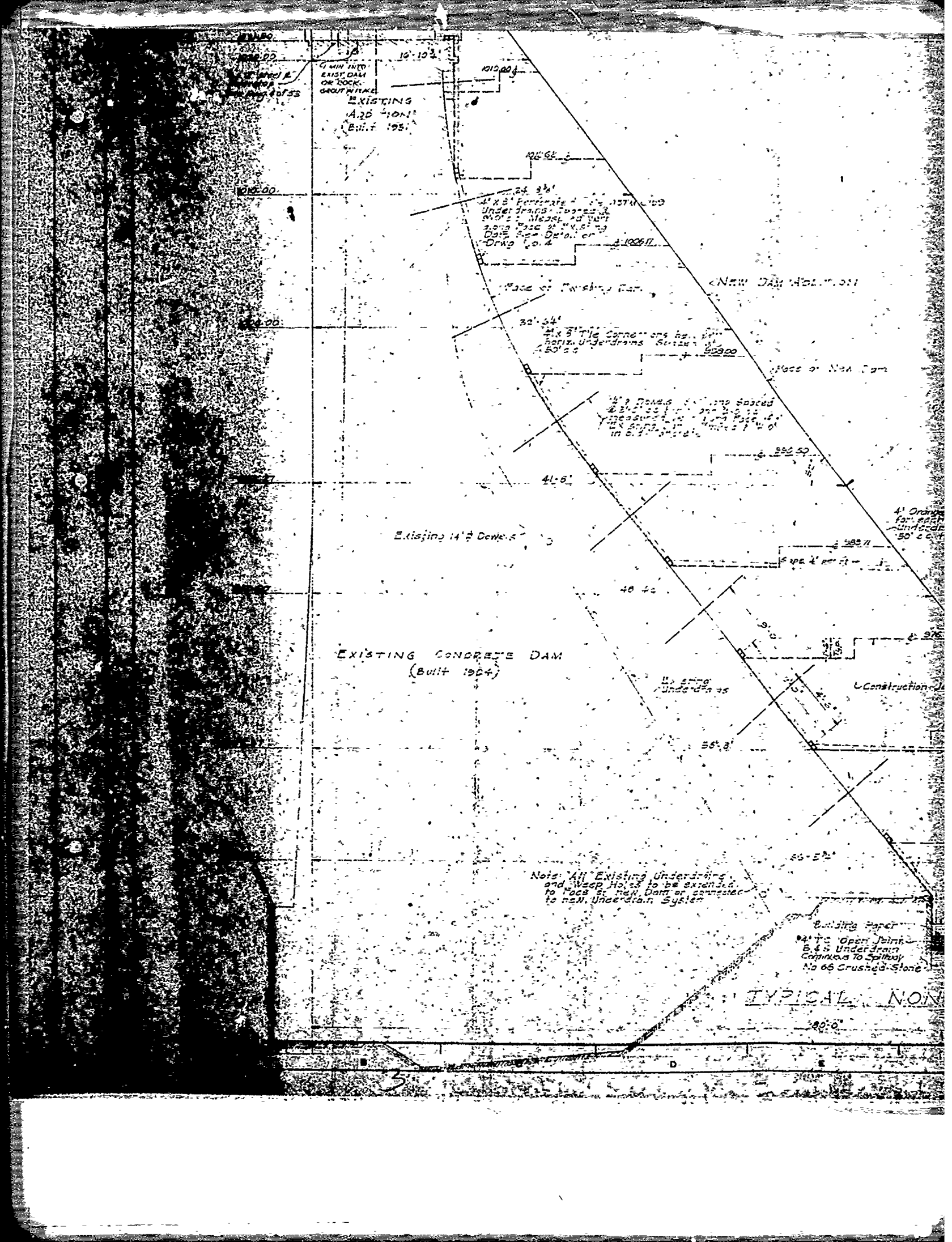



SITE PLAN
FOR THE
CITY OF
PLATE I

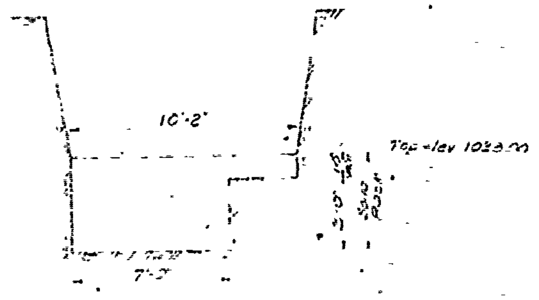

Orangeburg pipe
drains 6" I.D. at 6%
Elev. 255.50
102.00
102.00



2
2'-0"
3'-6"
2'-0"
2'-0"

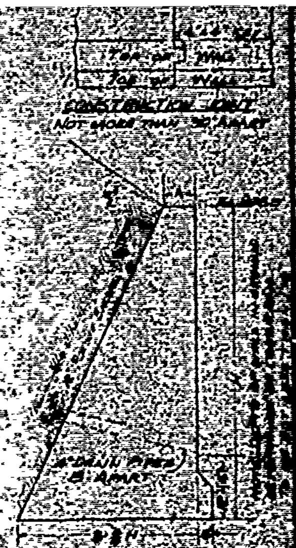

EXISTING
ABUTMENT
(Built 1951)
Face of Existing Dam
NEW DAM HOLDING
Face of New Dam
EXISTING CONCRETE DAM
(Built 1904)
Existing 14'ø Dowels
Construction
Note: All Existing Underdrains and Weep Holes to be extended to Face of new Dam or connected to new Underdrain System
Building Paper
4" Tile Open Joint Underdrain Continuous To Spillway
No 66 Crushed Stone
TYPICAL

DETAILS OF PARAPET WALLS
Scale ...

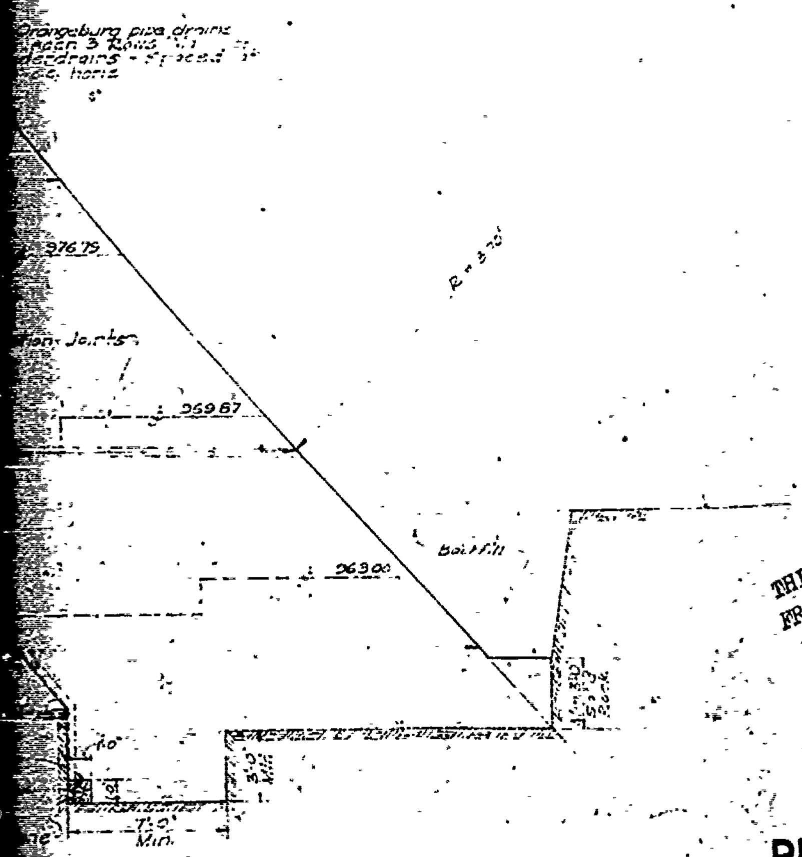


TYPICAL ... WALL SECTION
Scale ...

HEIGHT OF WALL H IN FEET	THICKNESS AT TOP IN FEET	THICKNESS AT BASE IN FEET	COMPRESSION AT TOE LBS SQ FT	AREA OF SECTION SQ FT
3	1'-0"	1'-9⅝	856	4.83
4	1'-0"	2'-4½	1141	7.43
5	1'-0"	3'-0"	1427	10.62
6	1'-0"	3'-7½"	1712	14.43
7	1'-0"	4'-2¾	1997	18.83
8	1'-0"	4'-9⅝	2282	23.83
9	1'-0"	5'-4½	2569	29.43
10	1'-0"	6'-0"	2853	35.63
11	1'-1½"	6'-7½"	3139	42.96
12	1'-2⅞	7'-2⅞	3424	51.03
13	1'-3¾	7'-9⅝	3709	59.28
14	1'-4¾	8'-4½	3995	69.23
15	1'-6"	9'-0"	4280	79.98



CONCRETE GRAVITY RETAINING WALL
N.T.S



NON-OVERFLOW SECTION
Scale: ...

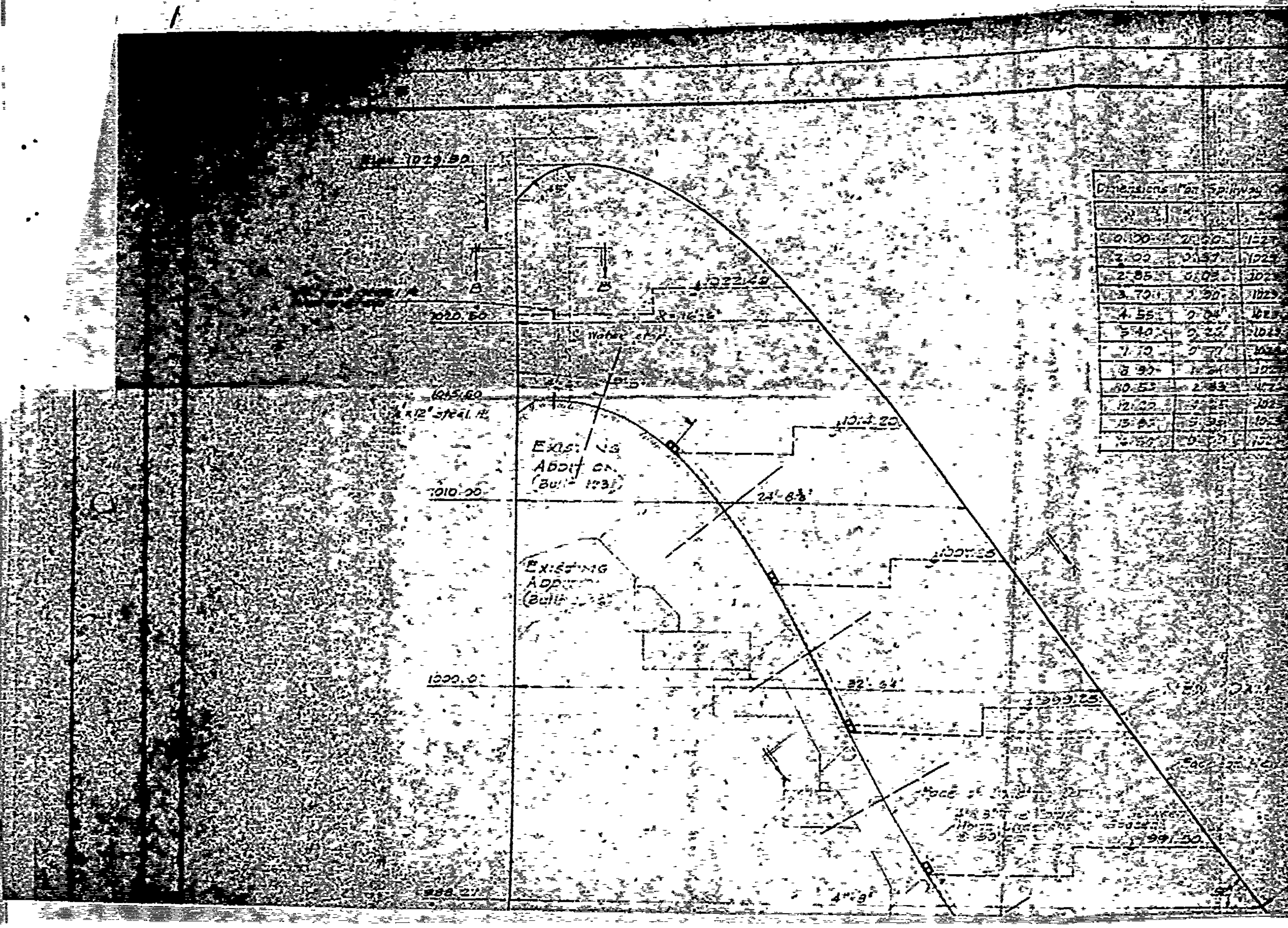
PLATE 2

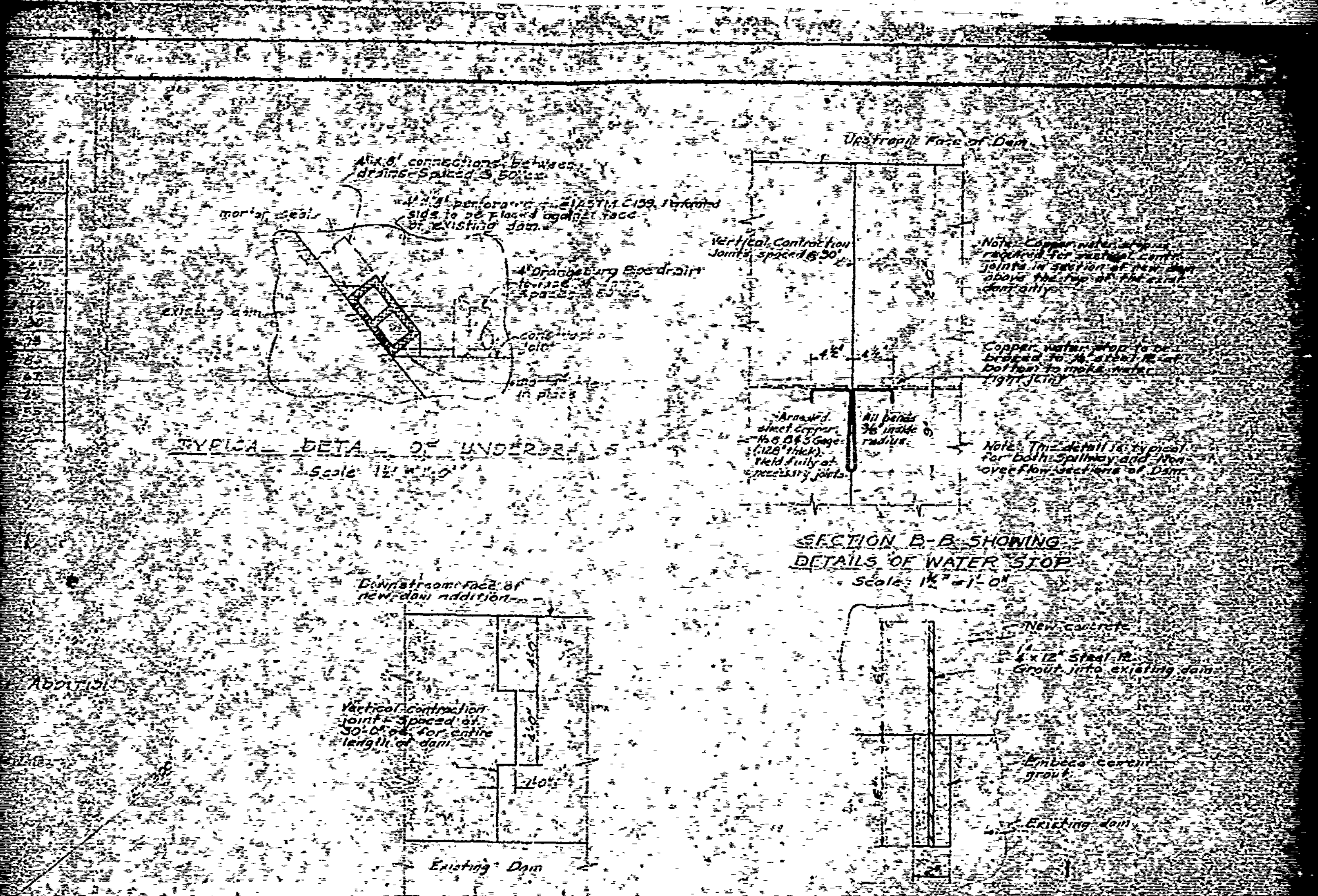
NON-OVERFLOW SECTION

PEDLAR DAM ...
FOR THE
CITY OF ...
LYNCHBURG ...

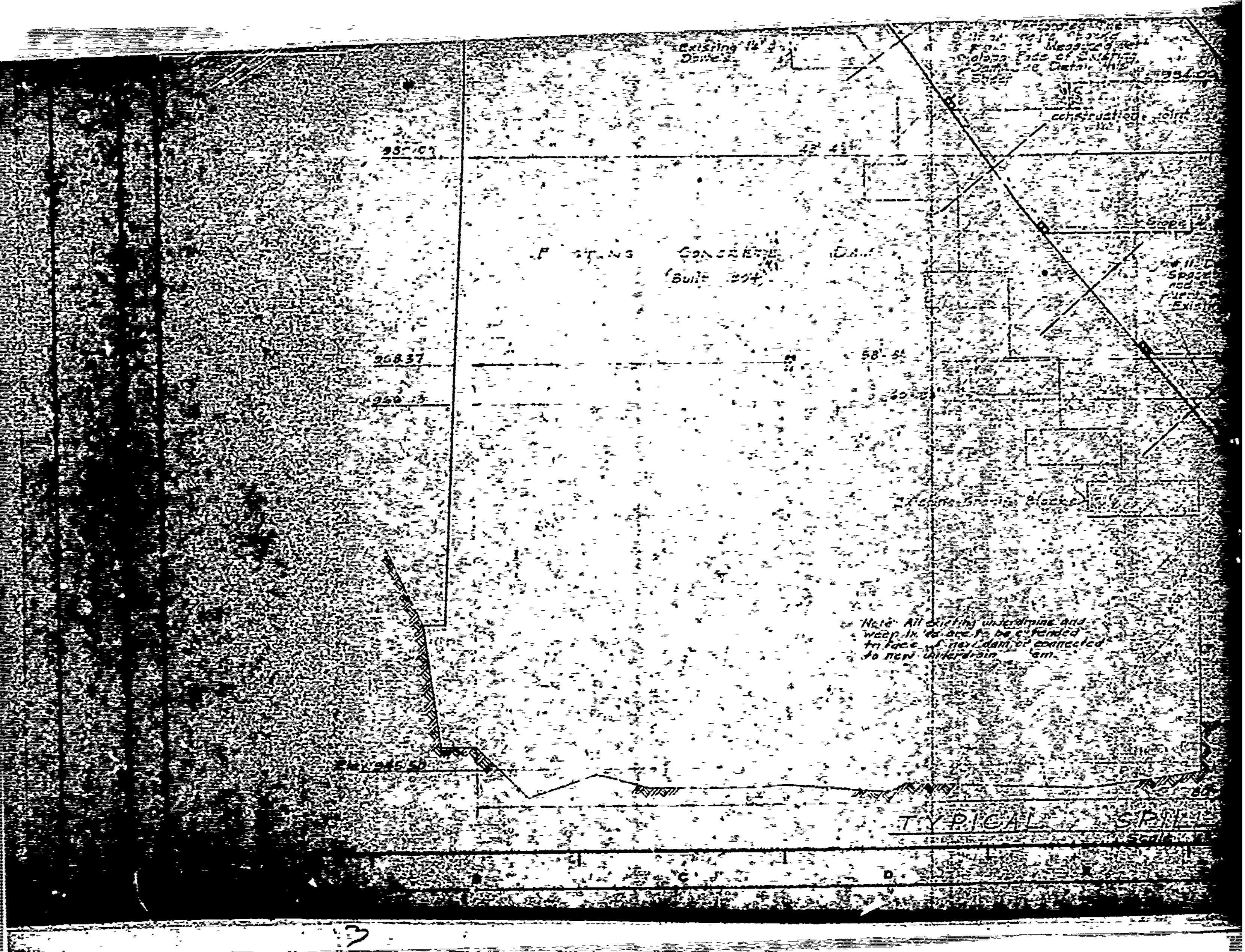
COMMONWEALTH OF VIRGINIA

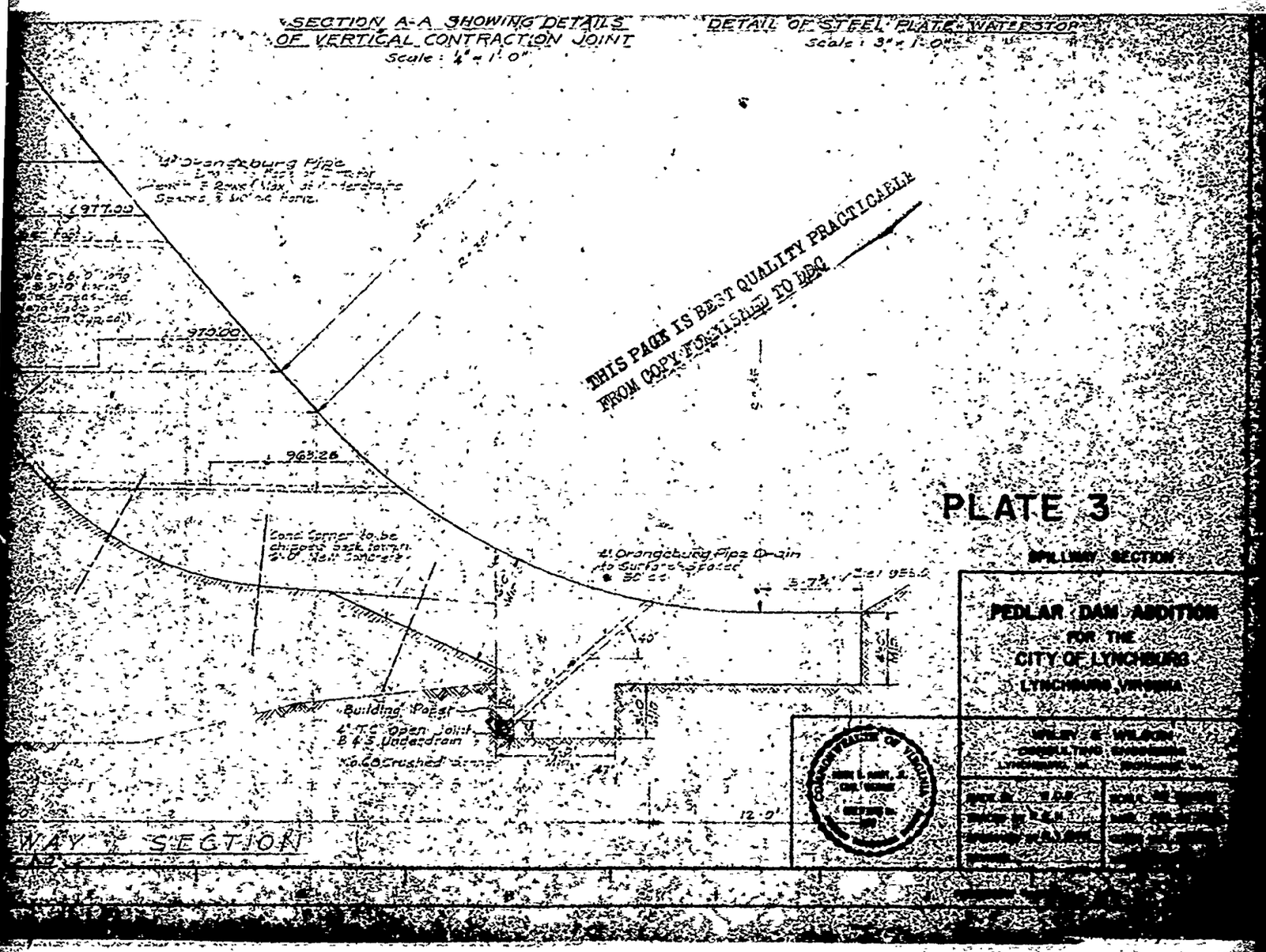
MADE BY
TRACED BY
APPROVED BY
REVISED

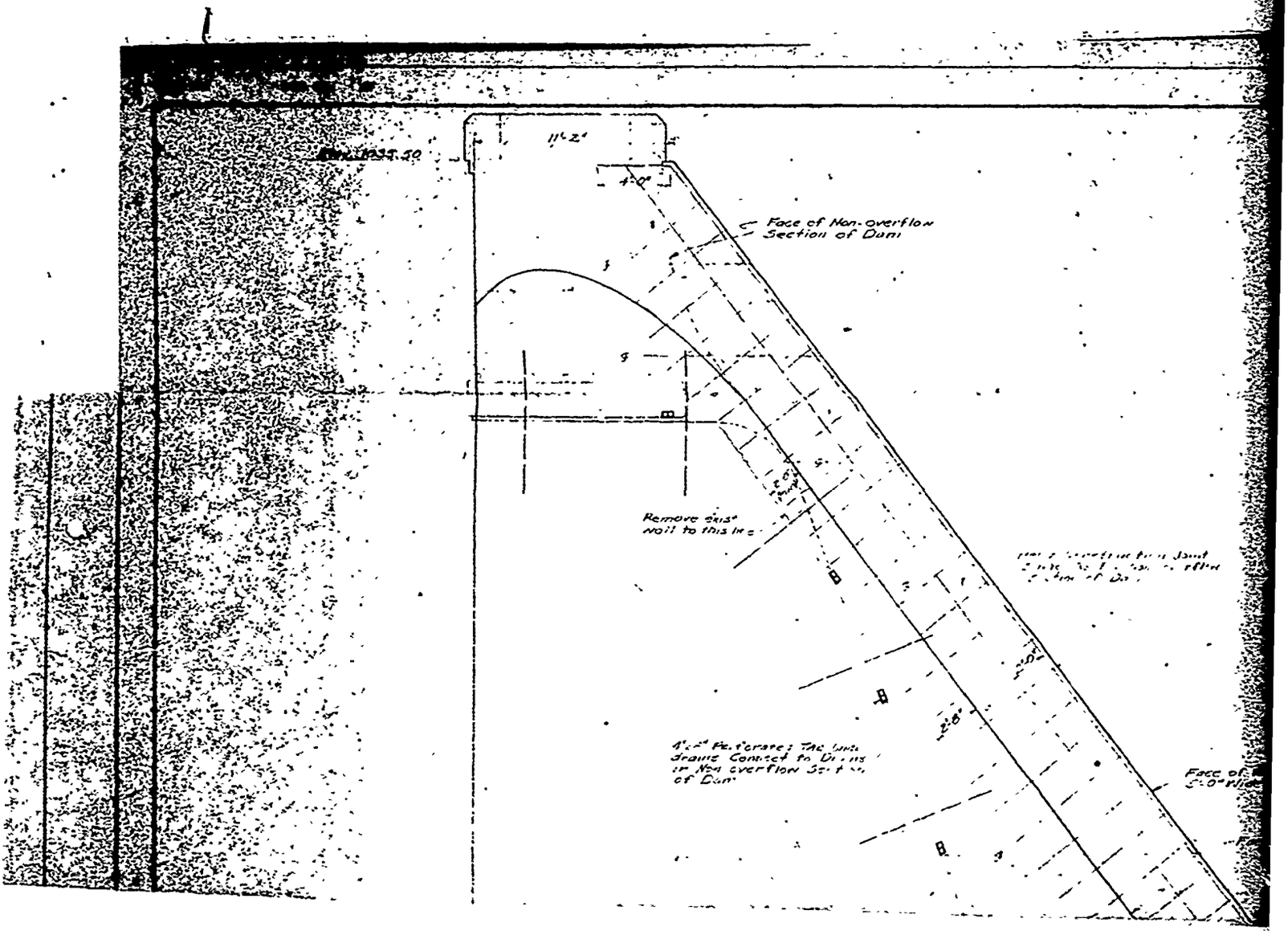

1029.90
1022.40
1020.60
1015.60
1014.20
1010.20
Existing
1000.0
991.50

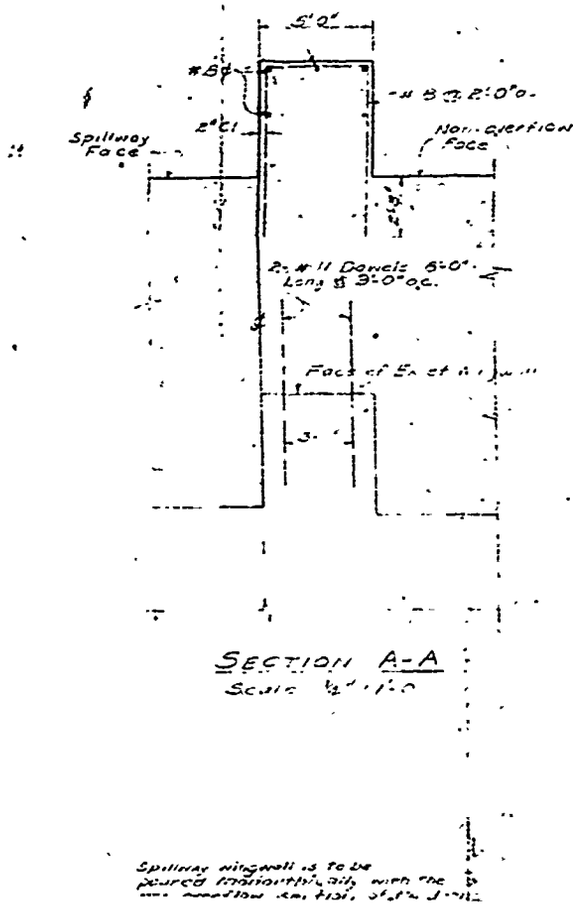


Upstream Face of Dam
mortar seals
existing dam
4" Orangeburg Pipe drain
Vertical Contraction Joints spaced @ 30'
Note: Copper water stop is required for vertical contr. joints in section of new dam above the top of the exist. dam only.
Copper water stop to be brazed to ¼" steel PL at bottom to make water tight joint.
Armored sheet Copper No 8 B&S Gage (.128" thick) weld fully at necessary joints.
All bends 3/8" inside radius.
Note: This detail is typical for both Spillway and Non-overflow sections of Dam.
TYPICAL DETAIL OF UNDERDRAINS
Scale 1½"=1'-0"
SECTION B-B SHOWING DETAILS OF WATER STOP
Scale 1½"=1'-0"
Downstream face of new dam addition
Vertical contraction joint - Spaced at 30'-0" o.c. for entire length of dam.
Existing Dam
New concrete
¼" x 12" Steel PL
Grout into existing dam
Embeco cement grout
Existing dam

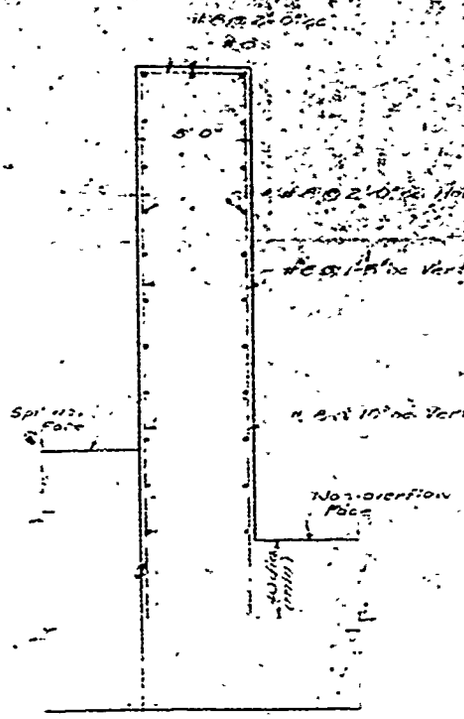

Existing 1½" Dowels
Construction Joint
Slope
968.37
Elev. 946.50
TYPICAL SPIL
Scale


SECTION A-A SHOWING DETAILS OF VERTICAL CONTRACTION JOINT
Scale : 4" = 1' 0"
DETAIL OF STEEL PLATE WATER STOP
Scale : 3" = 1' 0"
4" Orangeburg Pipe
977.00
970.00
963.25
Cond. Corner to be chipped back to min. 2" of Wall Concrete
4" Orangeburg Pipe Drain
Building Paper
4" T.C. Open Joint
B & S Underdrain
No. 68 Crushed Stone
12'-0"
WAY SECTION
THIS PAGE IS BEST QUALITY PRACTICABLE
FROM COPY FURNISHED TO DDC
PLATE 3
SPILLWAY SECTION
PEDLAR DAM ADDITION
FOR THE
CITY OF LYNCHBURG
LYNCHBURG, VIRGINIA


11'-2"
4'-0"
℄ Face of Non-overflow Section of Dam
Remove exist. nail to this line
4" ø Perforated Tile Joint Drains Connect to Drains in Non overflow Section of Dam

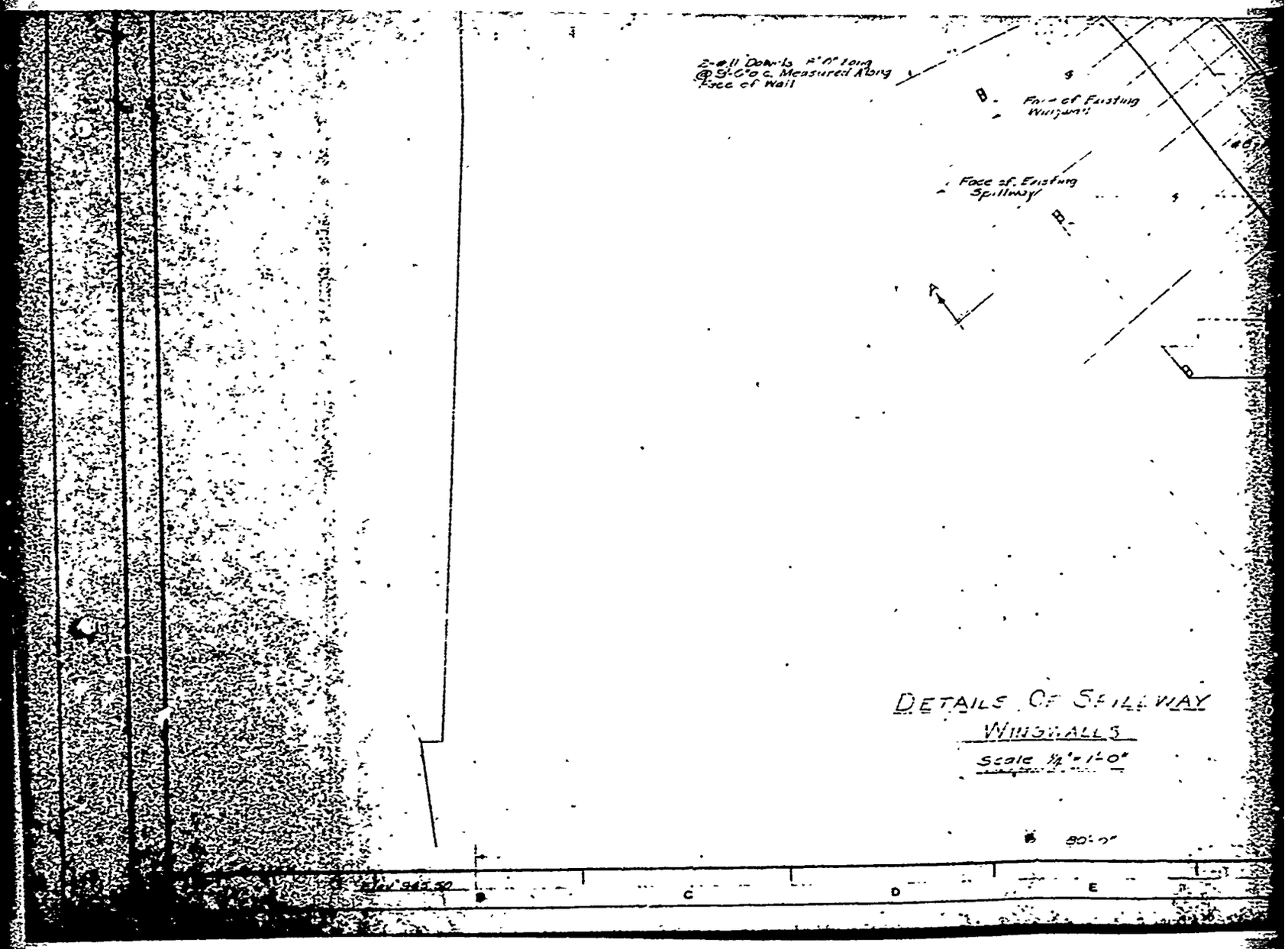


SECTION A-A
Scale ½" = 1'-0"



SECTION B-B
Scale ¼" = 1'-0"

Spillway wingwall is to be poured monolithically with the ... meadow ... slab.


2-#11 Dowels 8'-0" long @ 5'-0" c. c. Measured Along Face of Wall
Face of Existing Wingwall
Face of Existing Spillway
A
B
C
D
E
DETAILS OF SPILLWAY
WINGWALLS
Scale 1/2"=1'-0"

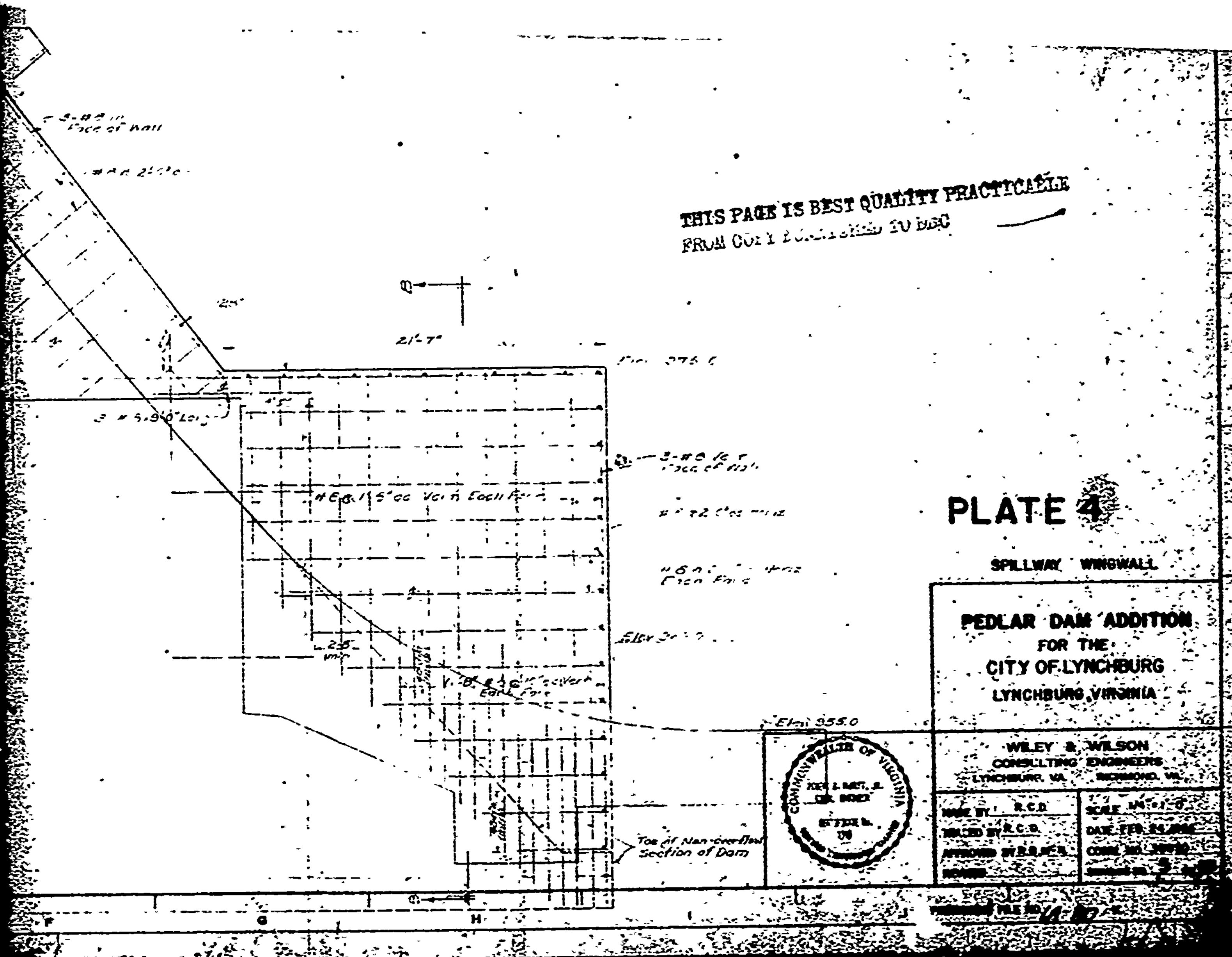
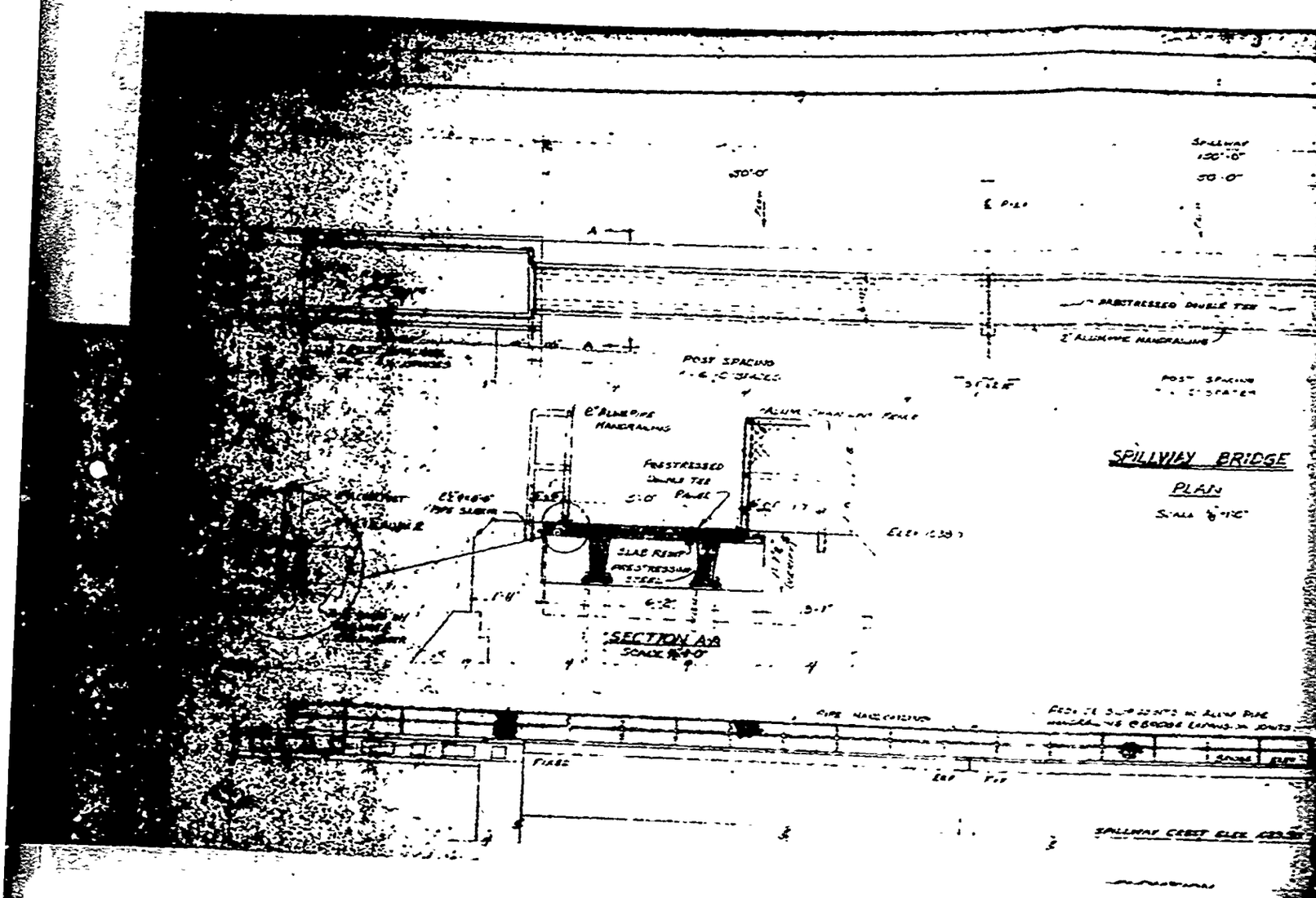
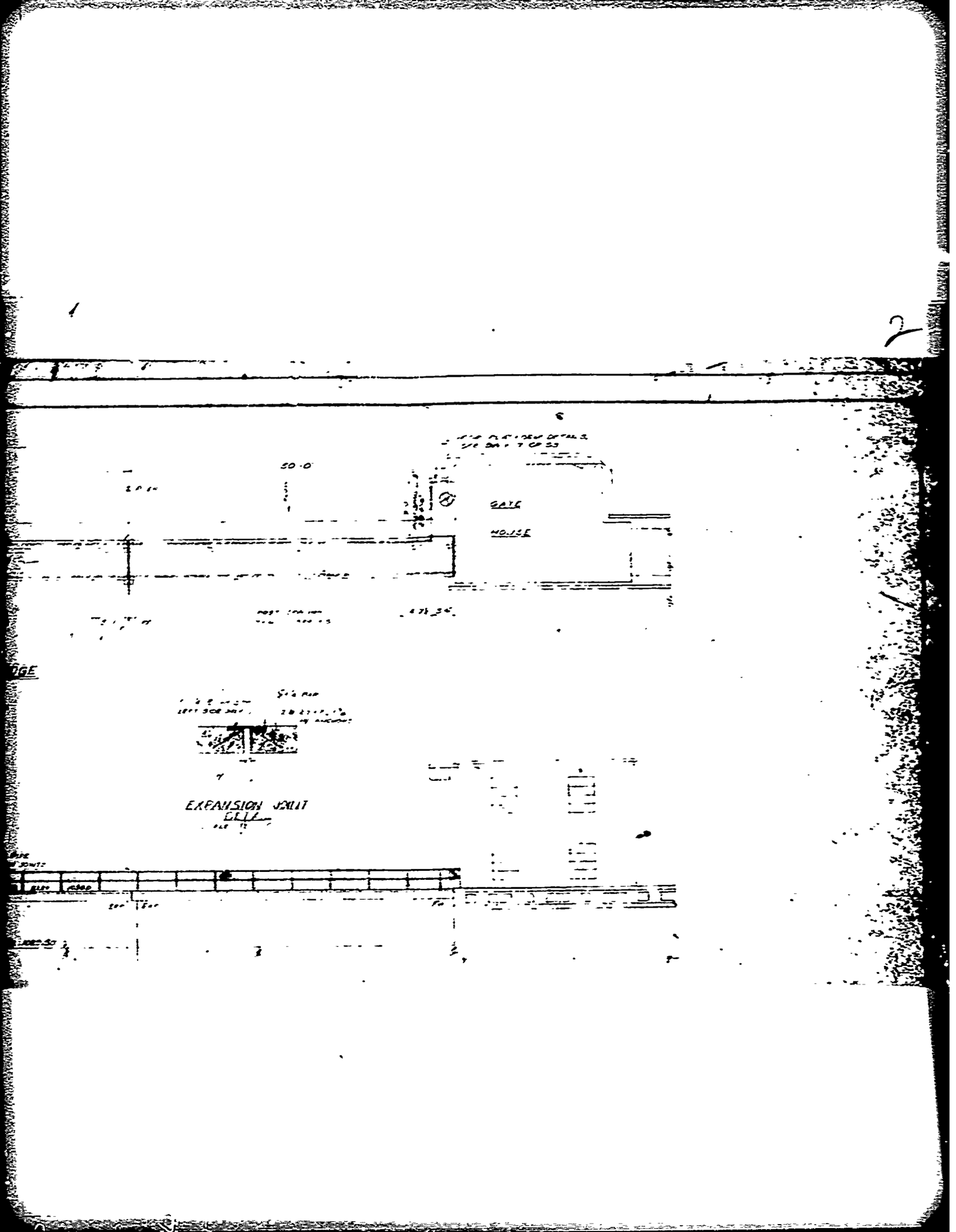
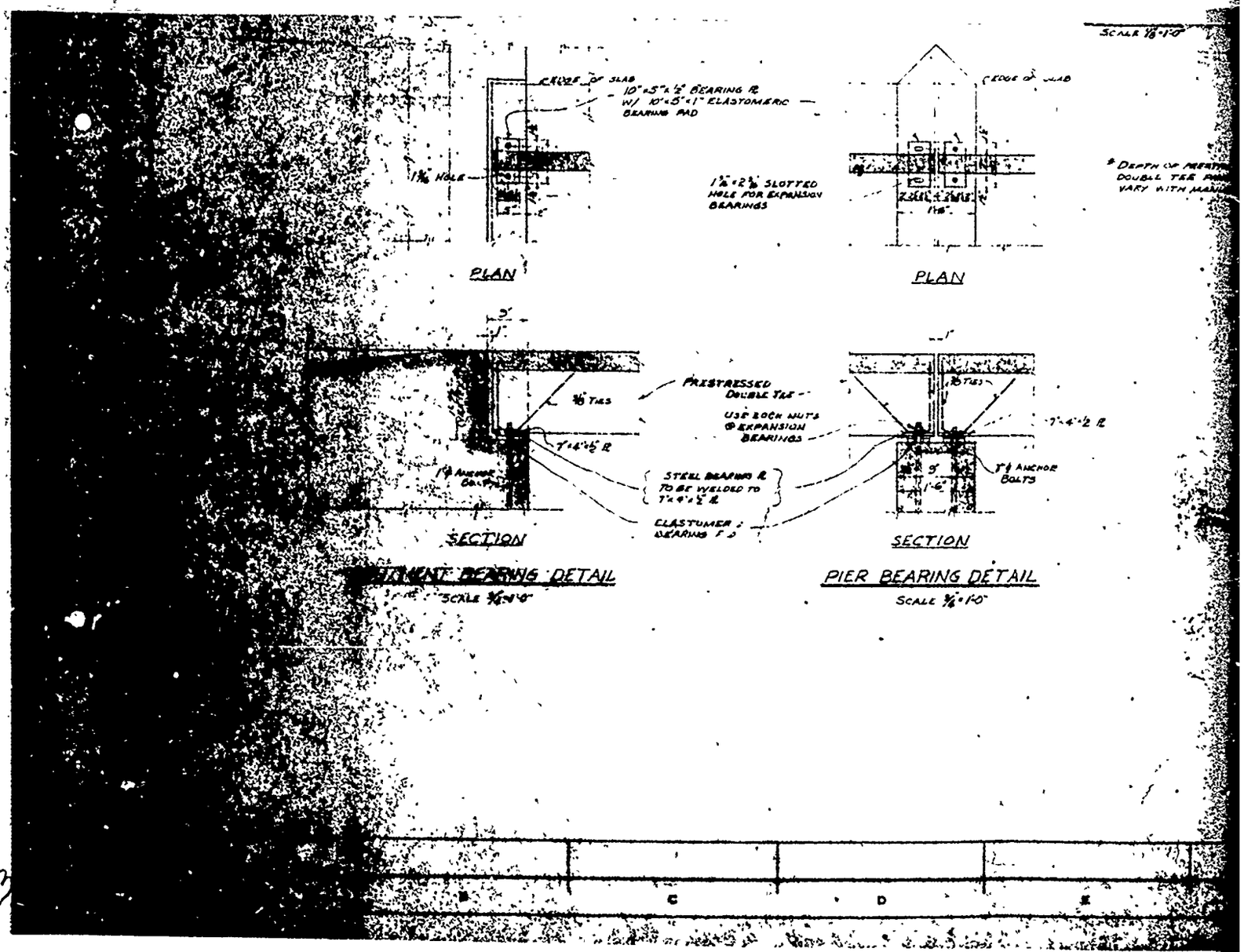
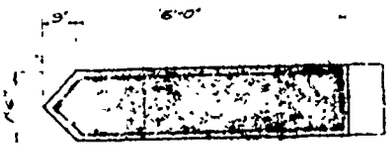


PLATE 4


SPILLWAY BRIDGE
PLAN
SECTION A-A

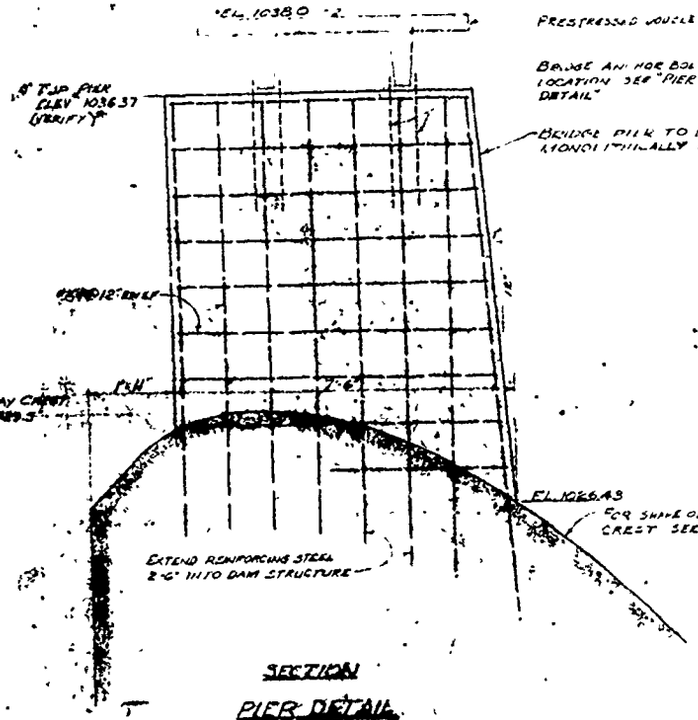

50'-0"
GATE
HOUSE
EXPANSION JOINT


EDGE OF SLAB
10"×5"×½" BEARING PL W/ 10"×5"×1" ELASTOMERIC BEARING PAD
1⅛" HOLE
1¼"×2½" SLOTTED HOLE FOR EXPANSION BEARINGS
PLAN
PLAN
PRESTRESSED DOUBLE TEE
USE LOCK NUTS @ EXPANSION BEARINGS
STEEL BEARING PL TO BE WELDED TO
ELASTOMERIC BEARING PAD
1" ANCHOR BOLTS
SECTION
SECTION
PIER BEARING DETAIL
SCALE ⅜"=1'-0"



PLAN

PRESTRESSED
E PANEL MAY
MANUFACTURER.



SECTION

PIER DETAIL

SCALE 1/2"=1'-0"

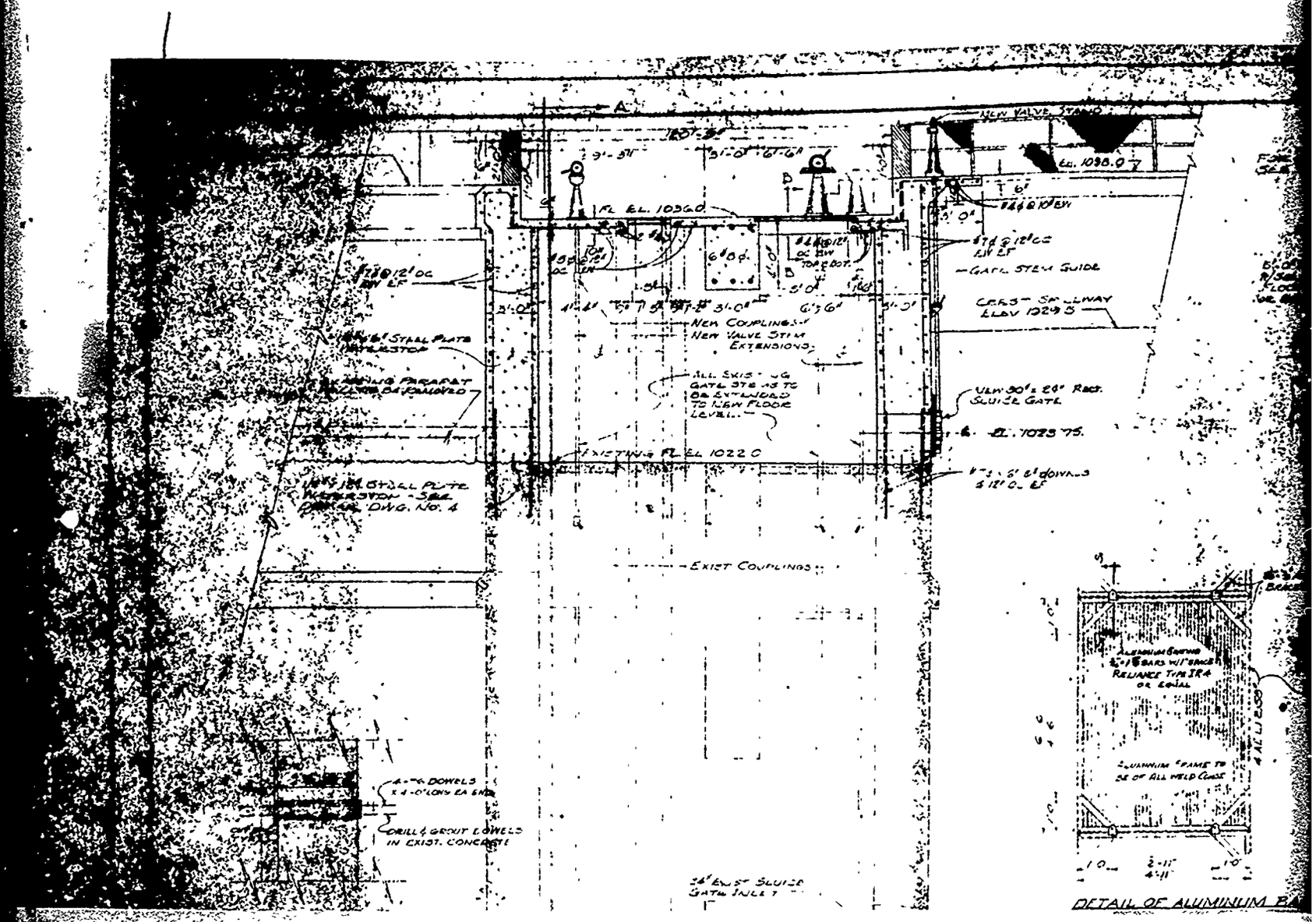
NOTES:

1. BRIDGE ANCHOR BOLTS TO BE 1" DIA. x 3'-0" AGLS W/ SW NUT @ 4'-1/4"-3/8" R WASHER AT ONE END & HEX NUT & STD. WASHER AT OTHER END. BE REQD.
2. ALUMINUM PIPE HANDRAILING TO BE FABRICATED FROM 2" SCHEDULE 40 ALUMINUM PIPE.
3. ALUMINUM CHAIN LINK FENCE SHALL BE 2" MESH, 6 GAGE (192"); W/ TOP SELVAGES KNUCKLED, AND SHALL BE ATTACHED TO HANDRAILING AS CALLED FOR IN THE SPECIFICATIONS.
4. PRESTRESSED BRIDGE PANELS SHALL SAFELY SUPPORT A SUPERIMPOSED UNIFORM LOAD OF 40 PSF OR A CONCENTRATED LOAD OF 5000 LBS. AT THE MIDPOINT OF THE SPAN.

SPILLWAY BRIDGE

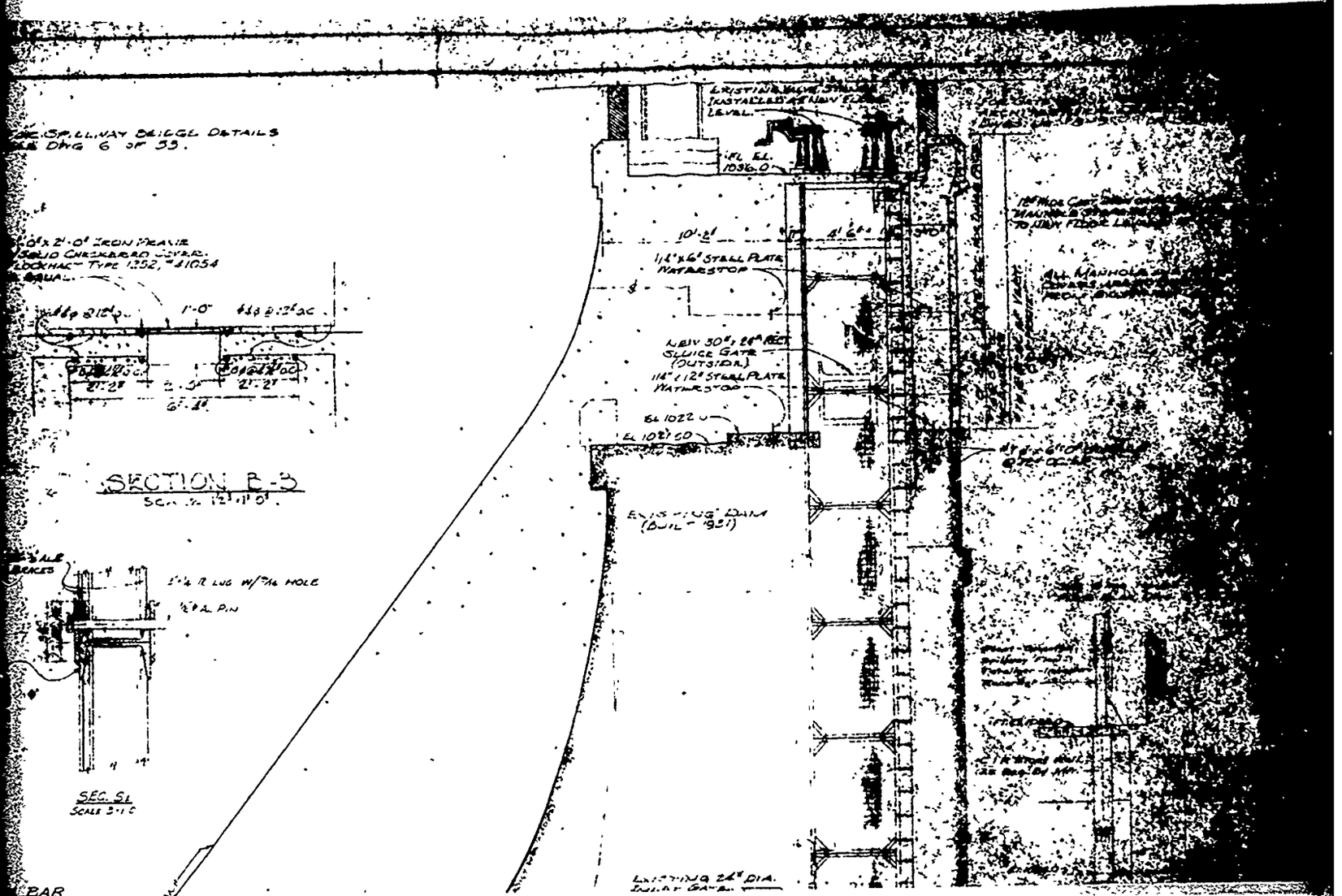
PERLAN DAM
FOR THE
CITY OF
LYNCHBURG

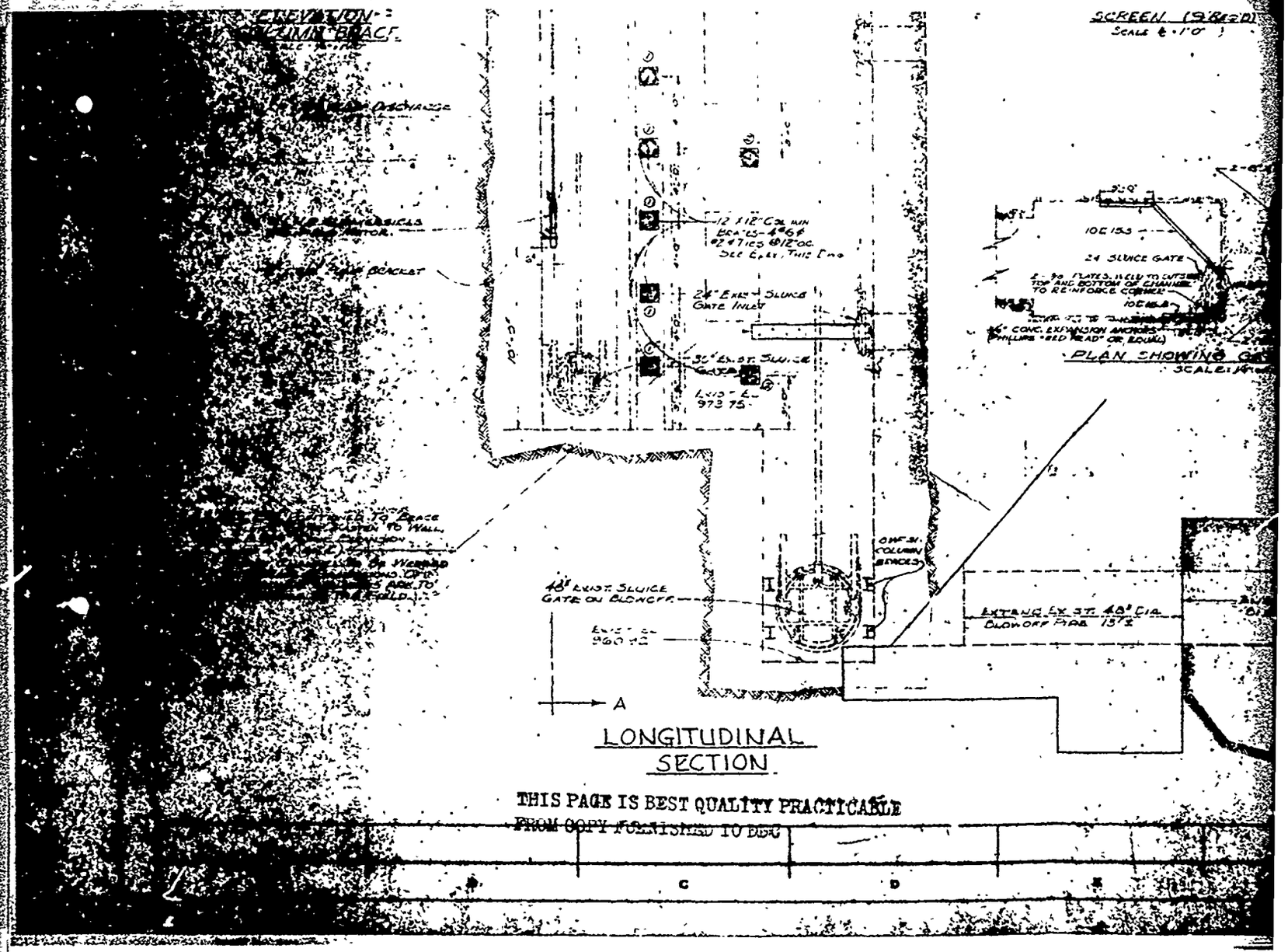
PLATE 5

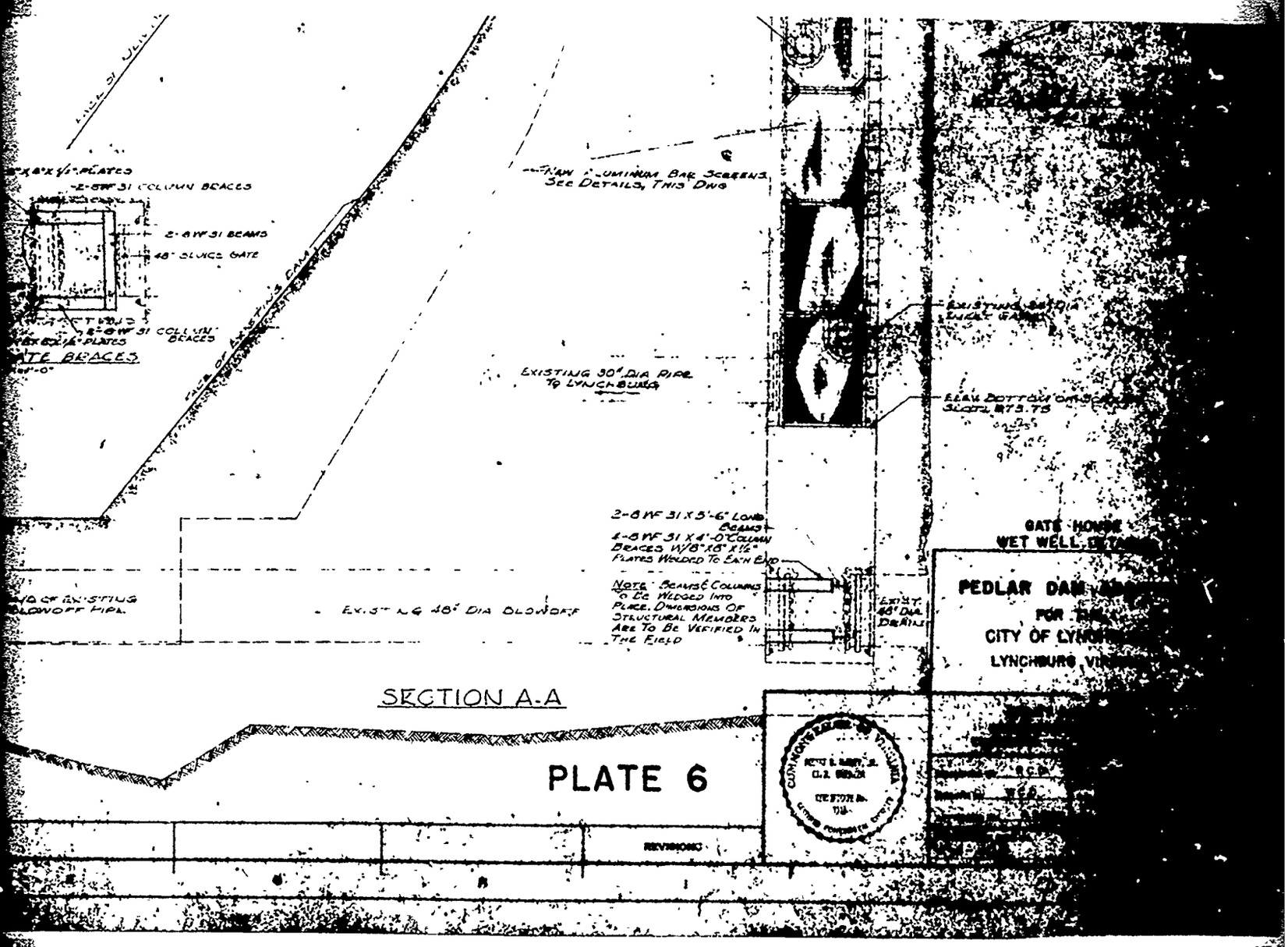

NEW VALVE STAND
EL. 1038.0
FL. EL. 1036.0
GATE STEM GUIDE
CONC. SPILLWAY
ELEV 1024.5
NEW COUPLINGS
NEW VALVE STEM
EXTENSIONS
ALL SKIRTING
GATE STEM TO
BE EXTENDED
TO NEW FLOOR
LEVEL.
VERT. 30" x 28" RECT.
SLUICE GATE
EL. 1023.75
EXISTING FL EL 1022.0
EXIST COUPLINGS
DRILL & GROUT DOWELS
IN EXIST. CONCRETE
24" EN ST SLUICE
GATE INLET
DETAIL OF ALUMINUM B

L

2


SEC. SPILLWAY OGEE GEL DETAILS
DWG 6 OF 39.
2'-0" x 2'-0" IRON HEAVIE
SOLID CHECKERED COVER
LOCKHAC TYPE 1352, #1054
EQUAL
1'-0"
SECTION B-3
SCALE 1/2" = 1'-0"
SEC. S1
SCALE 3"=1'
EXISTING VALVE
INSTALLED AT
LEVEL
EL EL.
1036.0
101.21
1 1/2" x 6" STALL PLATE
WATERSTOP
L.BIV 30", 28" RECT
SLUICE GATE
(OUTSIDE)
1/4" x 12" STALL PLATE
WATERSTOP
EL 1022.0
EL 1021.50
EXISTING DAM
(BUILT - 1951)
EXISTING 24" DIA.
BULLET GATE
PAB





SECTION A-A

PLATE 6

APPENDIX II

PHOTOGRAPHS

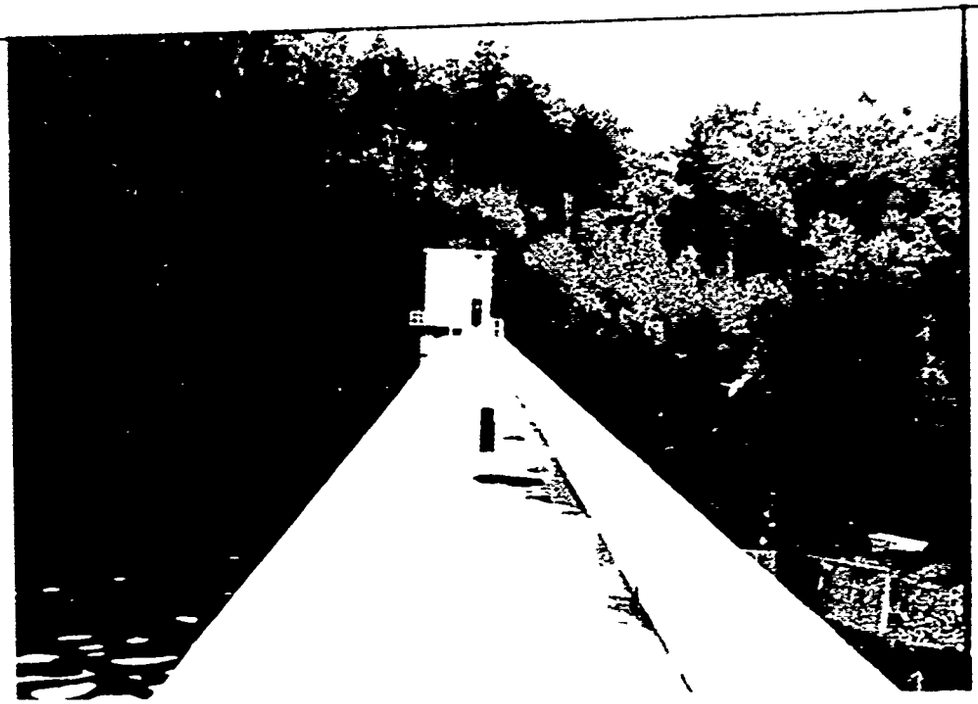


PHOTO #1 WALKWAY

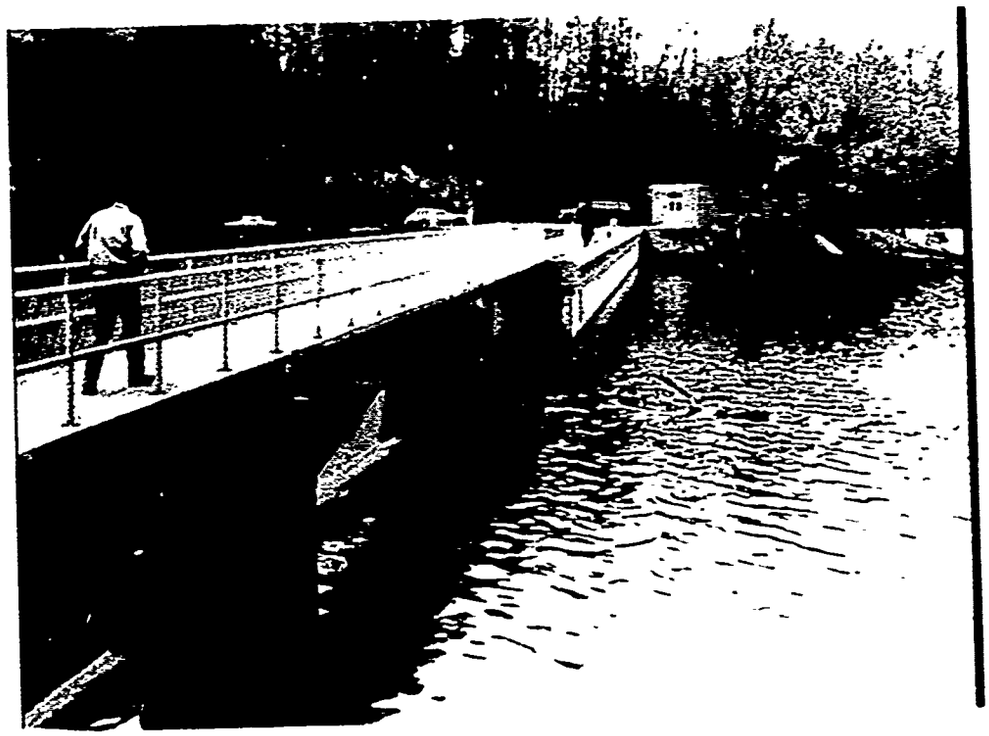


PHOTO #2 WALKWAY & OVERFLOW SECTION

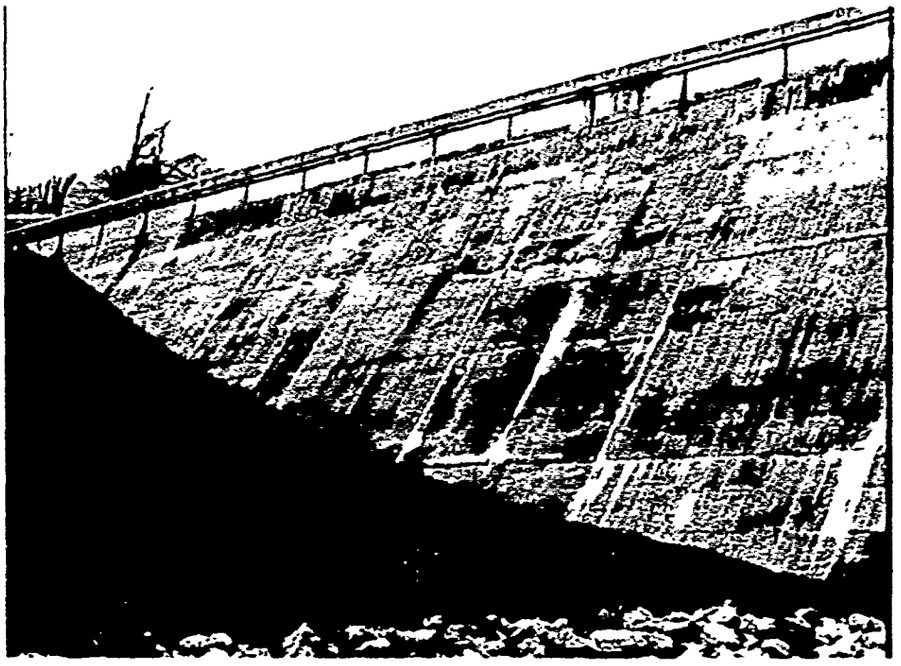


PHOTO #3 DOWNSTREAM FACE

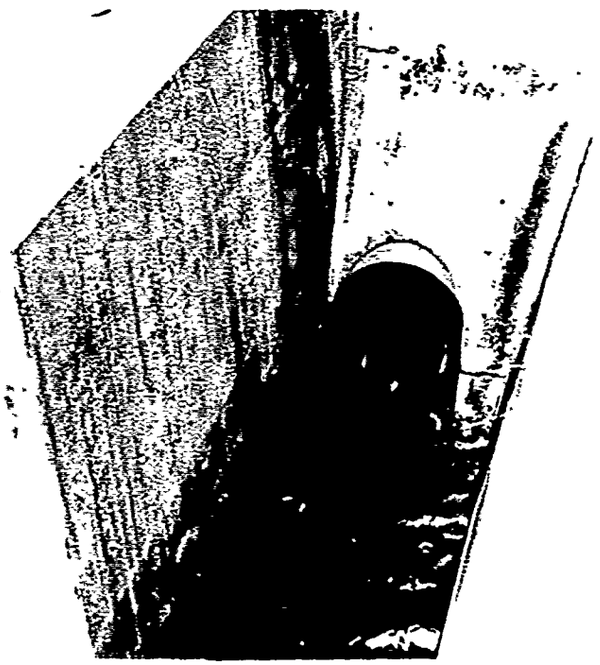


PHOTO #4 RESERVOIR / MUD DRAIN OUTLET

PHOTO #5 DOWNSTREAM AREA

PHOTO #6 CONTACT LEFT ABUTMENT

APPENDIX III

FIELD OBSERVATIONS

Check list
Visual Inspection
Phase I

Name Dam: Pedlar River County: Amherst State: Virginia Coordinates: Lat 3740.2
Long 7916.6

Date(s) Inspection: 1 May 80 Weather: Cloudy & cool Temperature: 55°F

Pool Elevation at Time of Inspection: 1029.7 ft. MSL Tailwater at Time of Inspection: 963.3 ft. MSL

Inspection Personnel:

D. Pezza, COE
J. Robinson, COE
B. Taran, COE
D. Cummings, COE
R. Shaug, COE
D. Bushman, SWCB
L. Musselwhite, SWCB
H. Gildea, SWCB
D. Hartman, Owner's representative
R. Howard, Dam caretaker
R. Davis, Owner's representative

Robinson, Cummings, & Shaug Recorders

CONCRETE/MASONRY DAMS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATION
SEEPAGE/LEAKAGE	There is no visible seepage along the face of the dam. Most of the horizontal joints and some of the vertical joints show signs of calcium leaching.	None.
STRUCTURE TO ABUTMENT/EMBANKMENT JUNCTIONS	The right abutment is formed by moderately sloping ground. The left abutment is formed by a steep rock slope. There is no sign of movement or distress on either abutment.	No seepage noted on either abutment.
DRAINS	Six drains are visible on the dam face. Of these, four have a small trickle of water. The drain closest to the left abutment has vegetation growing below it for several feet down the dam face.	None.
WATER PASSAGES	The spillway is slightly worn. Aggregate is visible at the surface.	None.
FOUNDATION	The foundation rock is a fine to medium grained micaceous shist. It is light grey-green when fresh and weathers to a yellowish brown. Joints on the right abutment have a WNW strike and a steep upstream dip. Left abutment joints have an E-W strike and a downstream dip. Spacings are from one to two feet. Joints are closed and only slightly weathered.	None.

CONCRETE/MASOI Y DAMS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATION
SURFACE CRACKS CONCRETE SURFACES	All concrete surfaces look very good. There is some pitting and only a few minor surface cracks.	None.
STRUCTURAL CRACKING	No structural cracks are visible in the dam itself except where the top of dam meets the parapet at the right end of the spillway. Contraction cracks between control joints appear in six locations along the parapets.	Cracks should be caulked or grouted.
VERTICAL AND HORIZONTAL ALIGNMENT	Alignment is good.	None.
MONOLITH JOINTS (VERTICAL)	Vertical joints are good with only slight chipping of edges. Calcium leaching is present along most joints.	None.
CONSTRUCTION JOINTS	Horizontal joints are in good condition. Calcium leaching is present along most joints.	None.

SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATION
CONTROL SECTIONS	The concrete ogee shaped weir crest appears in excellent condition. The flow over the spillway appears undisturbed.	None.
APPROACH CHANNEL	The approach channel is surrounded by a wire boom that attempts to prevent debris from reaching the spillway.	A large tree is located within the protected area. This tree should be removed before is passes over the spillway.
DISCHARGE CHANNEL	The concrete discharge channel appears in excellent condition. The flow seems to flow undisturbed until it reaches the stilling basin at the toe of the dam.	None.
BRIDGE AND PIERS	The concrete bridge crossing the spillway appears to be in excellent condition. In times of extreme high flow, the concrete slab should offer little resistance.	None.
EMERGENCY GATE	The 48-inch blow off valve can be operated to lower the reservoir elevation if needed.	None.
GATES AND OPERATION EQUIPMENT	A gate house is located on top of the dam to the left of the spillway. The 30-inch water supply valve and the 48-inch blow off valve can be controlled inside the gate house.	The gate house walls have extensive settlement cracks.

INSTRUMENTATION

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATION
MONUMENTATION/SURVEYS	There are no monuments.	None.
OBSERVATION WELLS	There are no observation wells.	None.
WEIRS	A small weir is located at the end of the stilling basin. Water passing downstream passes over this weir during normal flows.	None.
PIEZOMETERS	There are no piezometers.	None.
STAFFGAGES	Water stages are obtained by reading elevations marked on the concrete below the gate house.	None.
OTHER	A rain gage is located on the walkway of the dam and another is located about 40 feet downstream of the dam on the right abutment. Daily readings are recorded and passed along with flow depths to the Lynchburg City office.	None.

RESERVOIR

VISUAL EXAMINATION	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	The area slopes are mild to steep with heavy tree cover. The drainage area is located within the George Washington National Forest. Only minimal slope erosion is apparent around the reservoir.	None.
SEDIMENTATION	It was reported by D. Hartman, city representative, that there is about 2 feet of sediment located upstream of the dam.	None.

DOWNSTREAM CHANNEL

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	The downstream channel travels through a narrow gorge for several miles. The area is lined with heavy tree growth. Debris appears to pose no problems in this area.	None.
SLOPES	The area slopes are steep and wooded. The heavy growth of trees would slow flow velocities and pond water during a dam failure.	None.
APPROXIMATE NO. OF HOMES AND POPULATION	There are several homes located below the dam before the Pedlar River flows into the James River.	None.

APPENDIX IV

PEDLAR DAM OPERATING PLAN

PEDLAR DAM OPERATING PLAN

The City of Lynchburg's Utilities Division will employ a full-time dam caretaker. The dam caretaker will reside at the dam site. His residence will have a telephone and radio facilities in which to communicate with the water plant operators in Lynchburg.

The dam caretaker is responsible for the daily operation of the dam. The caretaker will operate the dam in accordance with Sate and Federal guidelines.

He is to be totally familiar with the manufacturers recommendations as to the operation of all mechanical equipment and is to operate such equipment accordingly.

The dam caretaker manually controls the flow of raw water to Lynchburg in accordance with the needs of the City.

The dam caretaker is to inspect the dam and adjoining structures in accordance with the maintenance plan.

The caretaker will be provided with a supply of small tools and other maintenance and emergency equipment to effect routine or temporary emergency repairs to dam equipment. A small gas powered generator will be maintained at the dam as an emergency source of electrical power for the radio and other essential pieces of equipment.

APPENDIX V

PEDLAR DAM MAINTENANCE PLAN

Every five (5) years the City will hire a qualified engineer to inspect the integrity of the dam and supporting structures. This inspection will be more thorough and detailed than those made by the operating staff and will include portions of the structures not ordinarily accessible, such as penstocks, conduits, etc. These inspections will be scheduled during periods of low water to check the condition of structures normally submerged and during a period of maximum overflow to check structural behavior under full load.

PEDLAR DAM MAINTENANCE PLAN

Daily inspection will be made by the dam caretaker, a qualified maintenance mechanic, or a qualified water plant operator of all portions of the dam and stilling dam and bridge that are readily accessible and all other portions of the dam where there is reason to believe that damage may have occurred. The inspector will be looking for the following items:

(1) Abnormal settlements, heaving, defections, or lateral movement of concrete structures.

(2) Cracking or spalling of concrete and opening of contraction joints.

(3) Deterioration, erosion, or cavitation of concrete.

(4) Abnormal leakage through foundation or formed drains or through concrete surfaces, construction joints, or contraction joints.

(5) Possible undermining of the downstream toe or other foundation damage.

(6) Unusual, abnormal, or inadequate operational behavior of the structure or any of its equipment.

(7) Abnormal subsidence of backfill or embankment areas.

(8) River aggradation or degradation and possible effect on the hydraulic operation of the dam or stilling basin.

Annual inspections by a qualified maintenance mechanic of all the dam's operating machinery and safety equipment shall be made. Lubrication and service schedules will be based on the recommendations of the manufacturer's instructions. All gates and valves will be exercised at least once annually.

Trash racks will be cleaned of deris as required.

Metalwork and woodwork will be pair ed as required to prevent decay of the structures.

APPENDIX VI

REFERENCES

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REFERENCES

1. Recommended Guidelines for Safety Inspection of Dams, Office of the Chief of Engineers, Department of the Army, Washington, D. C.

2. HEC-1DB Flood Hydrograph Package, (Hydrologic Engineering Center, U. S. Army Corps of Engineers, September 1978.)

3. "Probable Maximum Precipitation Estimates, United States East of the 105th Meridian," Hydrometeorological Report No. 51, (U. S. Weather Bureau, June 1978).

4. "Rainfall Frequency Atlas of the Unites States", Technical Paper No. 40, (U.S. Weather Bureau, May 1961).